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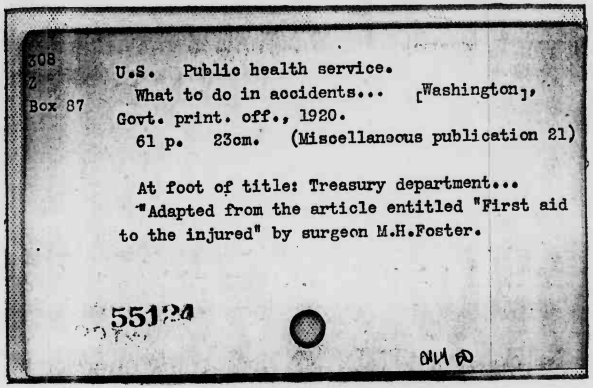

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WHAT TO DO IN ACCIDENTS

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Adapted from the article entitled "First Aid to the Injured" by Surgeon M. H. FOSTER.

WHAT TO DO IN ACCIDENTS.

IN CASE of accident or sudden grave illness, humanity demands that those who happen to be present should take all possible measures for the relief of the afflicted person. It is entirely possible for any person of ordinary intelligence to master enough of the art of first aid to be able to give a great deal of valuable assistance pending the placing of the patient under regular medical care, and such help, if properly and promptly administered, may frequently in severe cases be the means of actually saving life. When a person is hurt or suddenly becomes sick it is almost as important to know what not to do as it is to know what to do, for ignorant volunteer assistants have often done their friends more harm than good by their ill-advised treatment. Knowledge of what is best to do in such emergencies can only be obtained by some training and the use of a great deal of common sense. It is therefore desirable that everyone should spend a moderate amount of time in studying at least one of the various manuals which have been prepared on this subject.

GENERAL RULES AS TO WHAT TO DO IN CASE OF ACCIDENT.

The conditions under which accidents happen vary so much that it is difficult to lay down rules which will be broad enough to cover all cases, but there are certain principles which should be followed in a general way when disasters of this sort occur.

First. A rapid preliminary survey of the person should be made to determine what must be done, first of all, in any particular case.

This preliminary examination should endeavor to ascertain whether the injuries can properly be classified as serious or trivial. If the person is conscious, this information can be at once obtained upon inquiry. If unconscious, the nature of the accident will almost always decide as to the probable gravity of the case.

Second. Note quickly the surroundings.

This is for the purpose of deciding on how soon additional help can be obtained and whether the individual is in danger of further injury from the nature of the place in which he is. A person may be hurt by a falling building, or be found in a room filled with gas, and it may be likely that further injuries may be received from the same source unless he is immediately moved, or it may be perfectly proper to permit him to remain for the present where the accident occurred.

Third. Now make a more careful examination of the patient to determine the location and nature of the injury.

Frequently in case of accident a glance at the injured person will be sufficient to determine where and how he is hurt. One leg may be doubled up in an unnatural position, part of the clothing may be torn or marked, as by the black streak left by a car wheel, or blood may be appearing on some part of the body. It may be necessary to partially undo some of the clothing to ascertain more correctly the amount and source of bleeding.

If the patient is unconscious, note the color of the face and the condition of the skin; take the pulse, examine the eyes, feel the head for a possible fracture of the skull, and observe the manner in which the patient is breathing, especially watching for puffing of the lips.

Fourth. Determine the proper course of action under the conditions present.

Having gotten some idea as to the nature and extent of the injuries, the amount of help available, and the general circumstances of the accident, all of which should not consume more than a minute or two, it is necessary to lay out and follow a definite plan of procedure, which will depend upon the data which has been obtained. If the person is bleeding very rapidly, that must be attended to without further delay. If the loss of blood is not alarming, one can then proceed along the following lines:

If a doctor is within easy reach it may not be necessary to do more than to send one of the bystanders for him and make the patient as comfortable as possible pending his arrival. In sending for the doctor it is always best to give him as complete a statement of the nature and extent of the injury as is practicable. Then the doctor will know what instruments and other materials to bring with him. If circumstances permit, this information may be given in writing. If plenty of help is at hand another messenger should be immediately detailed to inform some one in authority of the accident. In a shop this would be the foreman of the shop or the superintendent of the plant; on board ship, the captain; in the street, the nearest policeman or police headquarters should be notified.

If the person is in a dangerous place or exposed to severe weather, it may be necessary to move him. If the danger is very imminent, this must be done at once, but all possible precautions should be taken to avoid increasing the damage already done, especially if there are any broken bones. In moving a person with a fracture the sharp ends of the bone may tear the flesh and even be driven out through the skin, creating a compound fracture, which is much more dangerous than a simple one. Having moved the patient, if absolutely necessary, or if it is decided to allow him to remain where he is pending the arrival of medical help, proceed to administer first aid, being guided by the following suggestions:

1. PLACE THE INJURED PERSON IN A PROPER POSITION.

Tight collars or belts should be loosened. The person should usually be kept lying down, or resting comfortably in a sitting position. If the face is pale, lower the head and have the person lie horizontally. If the face is flushed the head may be raised on a folded coat, blanket, or other suitable material. If vomiting occurs, turn the head to one side so that the vomited matter will run out of the mouth and not flow down the windpipe, which may cause choking, and later, on inspiration, pneumonia. Do not attempt to force unconscious persons to drink water or stimulants, as they can not swallow.

2. REMOVE CLOTHING.

In removing a coat or shirt to determine the amount of injury take the clothing off of the sound side first, and then it can be more easily removed from the affected part. This will avoid the danger of disturbing a fracture. It is sometimes advisable to cut the clothing off. In such a case cut along a seam or rip up a seam. Always cut the clothing when it is necessary to examine a badly injured or crushed limb.

In removing the clothing have a due regard for the proprieties and do not expose the patient unnecessarily.

3. TREAT THE MOST DANGEROUS CONDITION FIRST.

Always check serious hemorrhage before doing anything else. Put some sort of a dressing on a compound fracture before applying splints. Treat shock before dressing extensive burns. Be prepared to improvise headrests, tourniquets, splints, dressings, and stretchers out of material available.

4. PROTECT WOUNDS.

All wounds should be covered promptly with some sterile material, or if that can not be obtained the wound should be exposed to the air and the clothing fastened back out of the way, so that it will not rub against the wound or all over it.

5. BE ON THE LOOKOUT FOR SHOCK.

In severe injuries always examine for shock and administer suitable remedies if symptoms of shock are present. In this connection remember that keeping an injured person warm is of great importance even though he is not in shock. It is a general rule in first-aid work to keep the head cool and the feet warm.

6. HANDLE THE CROWD.

Always see that the patient has sufficient air. Keep the crowd back and do not permit the curious or overzealous to disturb the patient. Objectionable bystanders who are needlessly exciting the sufferer can

often be gotten rid of by sending them on errands, even if the errand is unnecessary.

WOUNDS.

DESCRIPTION.

Injuries in which the skin has been opened, torn, or punctured are called wounds.

Severe wounds may inflict great damage to the muscles, bones, vessels, or internal organs, but in all wounds there is a secondary danger that severe inflammation may follow. The likelihood of inflammation exists in small wounds as well as large ones; hence all wounds must be handled carefully to avoid this complication, as even a trivial injury like the prick of a pin has been known to result in death from this cause.

It is a matter of everyday experience that countless little cuts and scratches which every person receives during a lifetime almost always heal without trouble, no matter whether treated or not. It is also well known that occasionally these small injuries, and more often the larger ones, do not do well. The wound becomes red and painful, it throbs, the edges swell, and finally matter develops. This matter is called "pus." When the matter escapes the pain ceases and the cut gradually heals. At other times the redness rapidly spreads, and in a short time the entire arm or leg, as the case may be, becomes involved. Taken at this stage, prompt and vigorous surgical treatment may produce a cure, but if neglected the condition steadily grows worse and sometimes ends in death.

GERMS CAUSE INFLAMMATION.

Wounds become inflamed because disease germs have gained a foothold. These germs or bacteria are the smallest of all living things. Even when magnified by a powerful microscope they are not the fierce-looking animals with eyes, teeth, legs, etc., which are frequently represented in the newspapers, but in reality plants of the simplest kind. These minute plants occur in various forms; some resemble balls, others rods, and a few are spiral in shape similar to a piece of broken corkscrew. Like all other plants, they require warmth, water, and food in order that they may grow and flourish. All bacteria can be killed by heat and certain powerful chemicals, such as tincture of iodine, carbolic acid, or bichloride of mercury.

Bacteria multiply by the simple process of dividing into two. A groove forms around the germ; it gradually becomes deeper, finally cuts the germ into two parts, and in a short time there are two bacteria where there was one before. Under favorable circumstances this process of division may occur in as short a time as 20 minutes.

VARIETIES OF WOUNDS.

1. *Incised wounds.*—These are wounds in which the skin or tissues are cleanly cut with a sharp instrument.

2. *Lacerated wounds.*—Lacerated wounds are caused by some blunt instrument which tears and bruises the flesh.

3. *Punctured wounds.*—Punctured wounds are produced by narrow sharp-pointed instruments, such as nails, daggers, or bayonets. Bullet wounds are also included under this classification.

Many wounds are infected at the time they are received, because the knife or other instrument has bacteria on it and these were left in the flesh.

GENERAL PRINCIPLES OF THE TREATMENT OF WOUNDS.

From what has been said concerning the action of bacteria on wounds, it is evident that great care must be exercised in handling or dressing these injuries to prevent the introduction of living germs.

Sterilization.—The best way to kill bacteria is with heat. All dressings, instruments, and other substances which are used in wound dressing are therefore first heated, generally by boiling water or steam, and are then said to be *sterile*.

Preparation or sterilization of the hands.—The person who dresses a wound should thoroughly scrub his hands for five minutes with a nail-brush, hot water, and soap. Then the finger-nails should be cut short and the spaces under the nails thoroughly cleaned out, after which the hands and nails are again scrubbed for five minutes. After the second scrubbing the hands should be rinsed in clean water and soaked for several minutes in a solution of one to two thousand of bichloride of mercury, a 3 per cent solution of compound cresol, or a mixture of 2 parts of grain alcohol with 1 of water.

Sterile dressings.—Whenever possible, all dressings which are to be used on wounds should have been previously treated with heat so as to kill the bacteria.

Germicides and antiseptics.—Chemicals which will kill bacteria are called germicides. Tincture of iodine and carbolic acid are good germicides. Certain substances, while they are not able to kill bacteria to any great extent, can prevent them from growing, and such chemicals are known as antiseptics. A solution of boric acid is a good illustration of an antiseptic.

DISINFECTION OF WOUNDS.

If the wound is reasonably clean it is much better to simply apply tincture of iodine. This is done by taking a clean match or toothpick, twisting a small amount of cotton around the end to make a swab, dipping the swab in the iodine, and applying a light coat first

to the wound and then to the surrounding skin. When dirt and other substances have gotten into the injury, however, it is necessary to remove them.

In an emergency, if it is necessary to place the hands in the wound without washing, they should be covered with several thicknesses of sterile gauze, as this will assist in preventing infection of the wound. After picking out the gross particles of dirt the wound may be cleansed by flushing it with a suitable solution and scrubbing with pieces of sterile gauze. For this purpose use freshly boiled and cooled boric-acid solution made by stirring a heaping tablespoonful of powdered boric acid into a pint of hot water, or a 1 to 5,000 bichloride of mercury solution, or a 3 per cent compound cresol solution. Be careful about disturbing blood clots in wounds because this may start bleeding afresh.

HYDROGEN PEROXIDE.

The practice of applying hydrogen peroxide to fresh wounds is not recommended as a routine practice. It causes a great deal of pain, wets the wound, and is not an efficient germicide. Hydrogen peroxide may be used sometimes to check hemorrhage or to clean up an old leg ulcer, but it should not be applied to other wounds except on advice of a physician.

FIRST-AID PACKETS.

Small packages properly sealed and protected containing sterile materials for dressing a wound are carried by all soldiers and are often kept on hand for emergencies in factories, on trains, etc. Various kinds of first-aid packets are on the market, but an excellent one is supplied by the American Red Cross.

TREATMENT OF CUTS.

Small cuts.—Bleeding is beneficial as it serves to wash out bacteria. After hemorrhage has ceased, paint the wound and the surrounding skin for a considerable distance with a light coat of iodine. Apply a dressing of sterile gauze or freshly laundered muslin and hold in place with a bandage. A sterile gauze bandage makes a convenient dressing for small injuries around the fingers or hand. A piece of the bandage may be folded into a compress, or the bandage alone simply wrapped around the finger, care being exercised so that the part which goes next to the wound is not touched by the operator.

Large cuts.—These are apt to bleed freely, but unless an artery or large vein has been opened, the hemorrhage will in most cases cease of itself.

First-aid treatment.—Send for a doctor. If the blood comes in spurts apply a tourniquet. While waiting for the physician make the

patient comfortable and see that the clothing does not come in contact with the wound. If the patient has to be transported before medical help can be obtained, cover the wound with a number of thicknesses of sterile gauze, boiled dry muslin, or similar material. If these are unobtainable, use some freshly laundered article such as a clean handkerchief, towel, or napkin. Hold the dressings in place with a bandage.

LACERATED WOUNDS.

Most of these wounds are infected with bacteria at the time the injury is received, but severe bleeding is rare.

First-aid treatment.—Check hemorrhage if necessary. Send for a doctor. Cover the wound with a sterile dressing, making no attempt to disinfect it. While awaiting the arrival of the physician, make the patient as comfortable as possible and treat shock, if it is present. If no sterile dressing is available, leave the part exposed to the air but take care that nothing touches the wound. Treat crushes of the hand, arm, foot, or leg in the same manner.

PUNCTURED WOUNDS.

Punctured wounds are especially dangerous because bacteria may be carried deeply into the tissues where conditions are very suitable for their growth. Lockjaw not infrequently develops from such such injuries. Always examine the article which inflicted the injury to determine if the end may have been broken off in the wound.

Treatment.—An effort should be made to disinfect the wound with tincture of iodine. Take a toothpick and twist a small amount of cotton around one end. Dip it in the iodine. Then push it down to the bottom of the wound and work the iodine thoroughly into the tissues. Paint the surface with tincture of iodine and apply a sterile dressing. All these patients should be taken to a doctor to have him determine whether injections of antitetanus serum are necessary to prevent lockjaw.

INFLAMED WOUNDS.

Symptoms.—Sometimes after a wound has been received and dressed all goes well for a day or two and then the wound becomes painful and begins to throb. If the wound is extensive, the patient has fever, the tongue is coated, and there is considerable constitutional disturbance. In such cases a physician should be called at once. If no physician is available the dressing should be removed and the wound inspected. The edges will probably be swollen, dry, and stuck together and there will be a diffuse redness of the skin surrounding the injury. It will be necessary to open the wound sufficiently to allow the matter which is forming within to escape. This

can be done by boiling a probe, a hairpin, or some small blunt instrument, and then gently inserting it between the edges of the wound and opening them slightly. If the edges are not stuck together and fluid is escaping from the wound, do not attempt to open it any more. Wet dressings should now be applied. These should consist of from 4 to 12 layers of gauze, depending upon the size of the injury, which are wet in a freshly prepared boiled solution of boric acid.

TETANUS OR LOCKJAW.

Description.—Tetanus is a dangerous disease due to a particular kind of a germ which is introduced into the body by some sort of an injury, frequently a slight wound. The germ is often found in garden soil or street dust, coming principally from horse manure.

Symptoms.—The symptoms of tetanus are varied, but one of the most characteristic points is a stiffness of the neck and the lower jaw. Later on spasms of other parts of the body develop. The disease is extremely fatal, the mortality ranging somewhere between 50 and 85 per cent.

Treatment.—When a person has received a lacerated wound which has been much soiled by dust or dirt, or a punctured wound from a garden implement, the most important thing is to take the patient to a doctor and have him receive injections of antitetanus serum. This injection should be repeated at intervals of a week, until three doses have been given.

ABRASIONS.

Abrasions are very superficial wounds in which the outer layers of the skin have been rubbed or ground off by dragging the part forcibly over some rough surface.

Treatment.—If dirt has been ground into the injury it should be washed off with boric acid solution. If the surface is clean this is not necessary. A coat of diluted tincture of iodine, half strength or less may be applied, but ordinarily this is not necessary, and it is always very painful. Finally, dress with sterile gauze spread with boric acid ointment or oxide of zinc ointment.

SPLINTERS.

Small splinters may be removed from the flesh by means of a needle which has been passed once or twice through a flame and then cooled. Larger splinters may be extracted by passing a knife blade several times through a flame, cooling it, inserting the blade under the splinter and grasping the foreign body between the thumb nail and the knife.

WOUNDS CAUSED BY FISHHOOKS.

When the barbed end of a fishhook has entered the flesh, do not attempt to remove it by pulling it directly out. Such a procedure will cause great laceration and tearing of the tissues. The better plan is to depress the shank of the hook, push the point forward and onward in an upward direction, and bring it out on the surface at another point. The barbed end is then cut off with a wire cutter or file. The barbed end having been removed, the hook can be extracted by pulling on the shank without damage to the tissues.

BULLET WOUNDS.

Bullets make small, deep wounds which are generally classified as punctured wounds.

First-aid treatment.—Send for a doctor. If sterile gauze is available, cover the wound with that. Remember that there may be two wounds, one where the bullet went in, the other where it came out. If only one opening is seen, search for the other on the opposite side of the limb or body. Treat shock, if present.

SCALP WOUNDS.

Scalp wounds are common and often result from a blow on the head with a blunt object, such as a club or a beer bottle, the yielding scalp being caught between the rigid skull and the hard weapon.

First-aid treatment.—Check hemorrhage, if necessary, by laying a compress of sterile gauze on the wound and fastening it tightly with a bandage around the head. In severe cases a tourniquet may be tied around the forehead and head just above the ears. Send for a doctor. Treat shock if present.

WOUNDS OF THE ABDOMEN.

Shallow wounds of the abdomen are handled like similar injuries in other parts of the body, but deep wounds with escape of the bowels are very serious injuries and require special treatment.

First-aid treatment of wounds of the abdomen with escape of the bowels.—Send for a doctor at once. The bowels should be covered with several thicknesses of sterile gauze wet in boiled and cooled warm salt solution (a teaspoonful of salt to the quart of water). If no sterile gauze is at hand, boil a towel in a salt solution of the above strength, cool it until it is at body temperature, and then lay it over the intestines. Treat shock, which is certain to develop.

SNAKE BITES.

Description.—The bites of copperheads, water moccasins, coral snakes, and rattlesnakes are all poisonous. The diamond black rattlesnake is the most dangerous serpent of the United States. The bite from a small snake is not as poisonous as one inflicted by a large snake of the same species. The greater number of snake bites are received on the extremities.

Symptoms.—Intense pain, discolored swelling of the bitten part, which soon becomes very marked, and profound disturbance of the system. The general symptoms develop soon after the bite. They consist of great weakness and prostration, nausea, and a profuse flow of saliva. Paralysis of the muscles occurs in from three to four hours. Unconsciousness is rare, but the patient falls into a kind of stupor.

Treatment.—The bite is usually on the lower part of the limb, and a band made of a handkerchief, necktie, or similar article should be instantly applied a few inches above the wound between it and the heart and tightly twisted with a stick to shut off the circulation to the part and prevent the poison from being carried into the system by the circulating blood. The bite of most venomous serpents consists of but two punctures. These small wounds should be freely incised with a knife and then sucked. There is no danger in sucking the wound if there are no cracks or sores in the mouth or on the tongue. After the wound has been sucked it should be cauterized. This is done by applying carbolic acid or nitric acid on the end of a stick, such as a match stick or toothpick. Most of these injuries happen in the wilds, where such chemicals can not be obtained. Cauterization may then be performed by heating a nail, a knife blade, or some other metallic object, such as a suspender buckle, in a fire and freely burning all parts of the wound. On hunting trips a cartridge may be torn open and a little gunpowder poured on the wound and then ignited with a match.

After the wound has been sucked and cauterized so as to extract and destroy as much of the poison as possible, the tourniquet may be loosened. It should be allowed to remain loose for one minute and then tightened up again. Wait 20 minutes and if no alarming symptoms develop it is again released, and this time allowed to remain loose for two minutes, after which it is tightened. Another period of 20 minutes is allowed to elapse, and on this occasion the tourniquet is left off for three minutes. The procedure is continued for several hours, gradually increasing the time the tourniquet is off, and is known as using the intermittent tourniquet, the object being to allow only small quantities of the poison to get into the system at one time.

INSECT STINGS.

BEE STING.

The stings of bees and wasps and yellow jackets are very painful but not dangerous to life unless the victim is attacked by a large number of the insects.

Treatment.—If the sting remains in the flesh it should be pulled out and a drop or two of diluted ammonia water applied to the wound. A compress wet in cold water or cold boric-acid solution will help to allay pain.

STINGS OF CENTIPEDES, TARANTULAS, AND SCORPIONS.

The stings of these insects are very much more severe than those of wasps or bees and may cause considerable general weakness, headache, sweating, and vomiting, but they are practically never fatal.

Treatment.—The wound should be encouraged to bleed as much as possible and afterwards cauterized with carbolic acid or some other caustic, if available. Tincture of iodine may be applied. An ice compress should be placed over the wound to limit local reaction. General symptoms, such as prostration and headache, should be treated by moderate stimulation, giving aromatic spirits of ammonia, 30 drops in water every hour and supplementing this with half a cupful of very strong black coffee if necessary. Some authorities recommend the application of a constricting band, which is gradually loosened in order to prevent the poison from being taken up by the system rapidly.

DOG BITES.

Dog bites are usually minor lacerated wounds, but are especially dreaded on account of the danger of hydrophobia, which is almost invariably fatal.

Treatment of dog bites.—If a person is bitten by a healthy dog, the wound should be thoroughly swabbed with iodine, working the medicine well into all parts of the wounded flesh with a small swab of cotton on a clean toothpick and the wound treated in other respects as an ordinary lacerated wound. If the dog is sick, he should be confined and carefully watched. If he remains well for 14 days, there is little danger of hydrophobia developing in the patient. In no case should the dog be killed unless it is certain he is rabid, as in this way it will be impossible to tell whether or not he had rabies unless the head is sent to a laboratory for examination. If the dog has hydrophobia or is suspected of having hydrophobia at the time the injury is received, the wound should be thoroughly cauterized with pure nitric acid on a glass rod or the end of a match stick in the same manner as directed for the tincture of iodine. The acid

should be worked thoroughly into all parts of the wound, and the point of a glass medicine dropper makes an excellent instrument for this purpose. Care should be taken not to get the acid on the sound skin. Carbolic acid, followed by alcohol, may be used for the same purpose, but is not as efficient. This cauterization should, of course, be done by a physician if one is available. After the cauterization the patient should receive the Pasteur treatment, which consists of a series of injections covering a period of some weeks.

Symptoms of hydrophobia or rabies in a dog.—It is advisable that the public should know something about the symptoms of hydrophobia in animals. A dog which is developing the disease may show hardly any symptoms except weakness. Usually, however, the animal shows a marked change in disposition, refuses his food, is apprehensive and very restless. He is liable to run away from home, snap at anything in his way, and swallows sticks, stones, and other strange objects. Later on paralysis develops in the lower jaw. The jaw hangs down and saliva drools from the mouth. In the last stages the hind legs become paralyzed and the dog drags them. One should be especially careful about attempting to relieve a dog who apparently has some foreign object in the throat, the symptoms being that the jaw hangs down and saliva runs from the mouth. Such animals are very apt to be rabid, and if the hand is inserted into the mouth in an attempt to remove the supposed foreign body, the person may be bitten or injured accidentally by the teeth and infected with the disease. Hydrophobia usually does not develop within less than 10 days after the person is bitten, three weeks being about the average period. In rare instances the disease has appeared many months after the receipt of the injury. If the dog is suspected of being mad and has been killed after biting some one, the head should be cut off, packed in ice, and sent by express to the nearest laboratory for examination. Usually such laboratories are maintained by State health departments at the State capital.

BITES OF CATS AND OTHER SMALL ANIMALS.

These injuries are usually punctured and slightly lacerated wounds. The proper treatment is the application of tincture of iodine thoroughly worked into the wound, followed by a sterile dressing.

HEMORRHAGE OR BLEEDING.

ORDINARY BLEEDING.

In most wounds there is simply hemorrhage from the capillaries. The blood is red and flows steadily for a few moments, then the flow becomes slower, and finally loss of blood spontaneously ceases. Bleeding, from by far the greater majority of wounds, is of this

type. Such slight hemorrhage in reality is beneficial because it serves to wash bacteria out of the tissues if any have been deposited there. If bleeding from ordinary wounds does not cease spontaneously, it can practically always be checked by placing a pad of gauze over the wound and pressing it against the wound either by the hand or a bandage, in the meantime elevating the injury if it is in the arm or leg. Many wounds are on the extremities and this simple expedient of applying pressure and raising the part will be all that is required to control the bleeding in most cases.

Anything which makes the heart beat faster will increase hemorrhage, hence it is unwise to give stimulants to bleeding patients unless absolutely necessary to save life, and in all cases they should be kept in a recumbent or semirecumbent position and as quiet as possible.

Do not put styptics, such as Monsel's solution, turpentine, cobwebs, and similar substances in wounds to stop bleeding. Bleeding can be controlled by other methods, and the use of styptics is undesirable as a general rule.

BLEEDING FROM VEINS.

When a vein has been cut the blood wells up in the wound steadily and is dark red in color, sometimes almost black. If the vein is large, the blood flows rapidly, and a considerable amount may be lost. Such hemorrhage can be stopped by simply pressing a pad of sterile gauze over the wound and then elevating the part, having the patient lie down.

PACKING WOUNDS TO STOP BLEEDING.

1. In first-aid work if a doctor will arrive soon and severe bleeding of an extremity can not be stopped by elevation and the pressure of a pad on the wound, apply a tourniquet (p. ——).

2. If it is certain that medical aid can not be obtained in 4 hours, and the bleeding can not be checked by pressure and elevation of the part and becomes alarming, pack the wound.

3. Packing is also used to control hemorrhage from wounds of the trunk or neck which can not be controlled by pressure. Tourniquets, of course, can not be applied in these localities.

PREPARATION FOR PACKING A WOUND.

Everything which goes into the wound should be sterile, hence it may be necessary to apply a tourniquet (p. 17) to stop the bleeding while suitable preparations for packing are being made. The tourniquet should be loosened as soon as everything is ready. The bleeding may not recur, in which case packing will not be required. If bleeding of importance starts when the tourniquet is loosened, pack the wound.

Strips of sterile gauze or iodoform gauze make excellent packing material. If these are not at hand, strips of clean muslin may be boiled for 10 minutes, the water poured off, and the strips dried as well as possible by continuing to heat them in the pan with the lid off. Be sure there is enough material to fill the wound tightly. The muslin can be boiled at the same time as the instruments but in another pan.

EMERGENCY PACKING.

Even in camps or remote districts pans and a fire can generally be obtained and the bleeding controlled by a temporary tourniquet while the necessary articles are being boiled. However, if it is impossible to secure sterile materials, use the cleanest thing obtainable. Strips torn from a clean handkerchief, towel, napkin, or the sleeve of a shirt can be forced into a wound with a narrow stick, a buttonhook, a long wire nail, or a pencil. It is better to run the risk of infecting a wound than to allow a man to bleed to death. Such packing, however, should be removed as soon as sterile material can be obtained and the wound repacked if bleeding starts afresh.

BLEEDING FROM ARTERIES.

Blood from arteries comes in spurts or a fine jet and is bright red.

Treatment.—Very small bleeding arteries can often be controlled by pressure and slightly larger ones by packing, but as a general rule, if the artery is of any size and in an extremity, it will be best to apply a tourniquet immediately.

TOURNIQUETS.

Tourniquets are appliances used to check hemorrhage by compressing the arteries somewhere between the heart and the wound. It is well known that the flow of water through a soft tube, such as the tubing used on a fountain syringe, can be easily stopped by pinching the rubber between the fingers. Hemorrhage from a wound can be controlled in the same manner by pressing the main artery with the fingers or a pad against the bone which lies underneath or by making constriction around the limb by a very tight band.

In first-aid work it may be often necessary to improvise a tourniquet. For this purpose a handkerchief, necktie, towel, or any piece of material of sufficient strength, which can be knotted around the limb and twisted up with a stick, is frequently used. These are known as inelastic tourniquets, and when using them it is advisable, when time and circumstances permit, to place a pad over the main artery so as to make pressure on it directly.

FIG. 155.—Showing how much space should be left in tying a knot for a tourniquet.

FIG. 173.—The use of two pads to avoid bruising the flesh under the tourniquet and main artery of arm. Pair of shears used as lever to twist up tourniquet and held in position by handkerchief around the elbow.

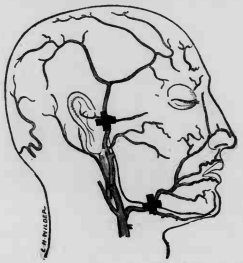

FIG 179.—Blood supply of the face. Crosses show points for applying pressure to check hemorrhage.

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INTENTIONAL SECOND EXPOSURE

Strips of sterile gauze or iodoform gauze make excellent packing material. If these are not at hand, strips of clean muslin may be boiled for 10 minutes, the water poured off, and the strips dried as well as possible by continuing to heat them in the pan with the lid off. Be sure there is enough material to fill the wound tightly. The muslin can be boiled at the same time as the instruments but in another pan.

EMERGENCY PACKING.

Even in camps or remote districts pans and a fire can generally be obtained and the bleeding controlled by a temporary tourniquet while the necessary articles are being boiled. However, if it is impossible to secure sterile materials, use the cleanest thing obtainable. Strips torn from a clean handkerchief, towel, napkin, or the sleeve of a shirt can be forced into a wound with a narrow stick, a buttonhook, a long wire nail, or a pencil. It is better to run the risk of infecting a wound than to allow a man to bleed to death. Such packing, however, should be removed as soon as sterile material can be obtained and the wound repacked if bleeding starts afresh.

BLEEDING FROM ARTERIES.

Blood from arteries comes in spurts or a fine jet and is bright red.

Treatment.—Very small bleeding arteries can often be controlled by pressure and slightly larger ones by packing, but as a general rule, if the artery is of any size and in an extremity, it will be best to apply a tourniquet immediately.

TOURNIQUETS.

Tourniquets are appliances used to check hemorrhage by compressing the arteries somewhere between the heart and the wound. It is well known that the flow of water through a soft tube, such as the tubing used on a fountain syringe, can be easily stopped by pinching the rubber between the fingers. Hemorrhage from a wound can be controlled in the same manner by pressing the main artery with the fingers or a pad against the bone which lies underneath or by making constriction around the limb by a very tight band.

In first-aid work it may be often necessary to improvise a tourniquet. For this purpose a handkerchief, necktie, towel, or any piece of material of sufficient strength, which can be knotted around the limb and twisted up with a stick, is frequently used. These are known as inelastic tourniquets, and when using them it is advisable, when time and circumstances permit, to place a pad over the main artery so as to make pressure on it directly.

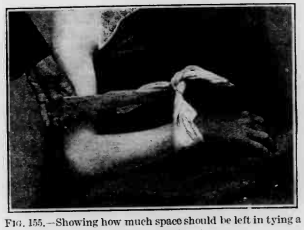

FIG. 155.—Showing how much space should be left in tying a knot for a tourniquet.

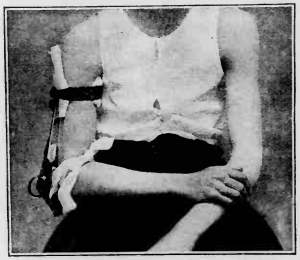

FIG. 173.—The use of two pads to avoid bruising the flesh under the tourniquet and main artery of arm. Pair of shears used as lever to twist up tourniquet and held in position by handkerchief around the elbow.

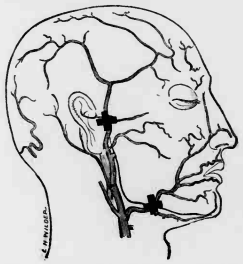

FIG 179.—Blood supply of the face. Crosses show points for applying pressure to check hemorrhage.

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FIG. 180.—Point for applying pressure for checking hemorrhage from forehead.

FIG. 181.—Method of applying tourniquet around forehead to check severe hemorrhage from the scalp.

FIG. 182.—Point of applying pressure in hemorrhage from the lips or cheek.

BLEEDING FROM NECK.

There are many large blood vessels in the neck, and if one or more of these are severed furious bleeding results.

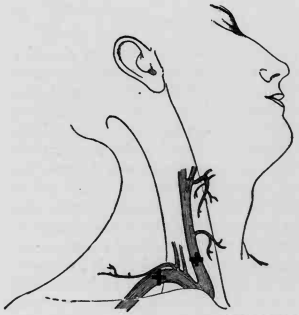

FIG. 183.—Main arteries of the neck. Crosses show points for applying pressure to check hemorrhage from neck, shoulder, or armpit.

FIG. 184.—Point of applying pressure to check hemorrhage from the neck.

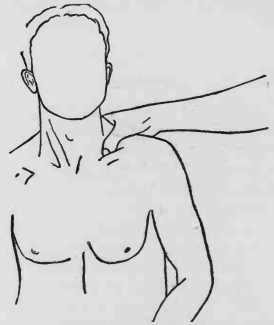

FIG. 185.—Point of applying pressure to check hemorrhage from the shoulder or armpit.

First-aid treatment.—It is impossible to apply a tourniquet to the neck, as it would cause immediate suffocation. Pressure inward and backward against the backbone should be made by the thumb, placed just above the breastbone. Make the pressures slightly from the side to avoid closing the windpipe (fig. 184). If the hemorrhage

INTENTIONAL SECOND EXPOSURE

FIG. 180.—Point for applying pressure for checking hemorrhage from forehead.

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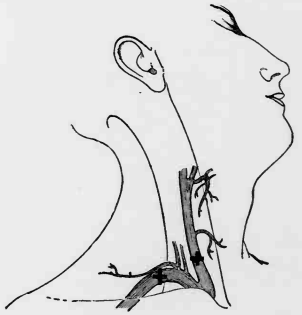

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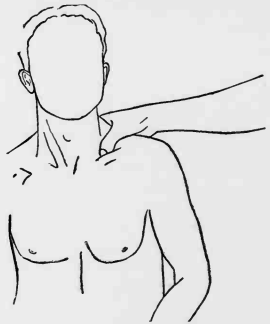
FIG. 184.—Point of applying pressure to check hemorrhage from the neck.



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is very severe, push the first available material at hand, such as a handkerchief or the end of a towel, into the wound, and hold it in place with backward pressure against the backbone. Send for a doctor at once. Have the patient sit up in a chair.

BLEEDING FROM THE NOSE.

If it becomes necessary to check nosebleed the patient should be placed in a semirecumbent position, that is, lying on a bed or couch with shoulders and head slightly elevated. This can be easily done by placing a tipped-over chair behind the patient. A flexible roll about 2 inches long and one-third of an inch in diameter should then be made out of newspaper or muslin and forced under the upper lip. This pad goes well up between the gum and the lip and does not rest on the teeth. It should be firmly pushed in place and should put the lip under considerable tension. The patient should remain absolutely quiet and should on no account blow the nose, as this will detach the clot and the hemorrhage will start afresh. Ice applied to the back of the neck will sometimes prove effective. If these remedies fail and the bleeding continues for a long time, as a last resort it may be necessary to pack the nostril. This is done by introducing into the nose a long strip of gauze or muslin about an inch and a half wide by means of a blunt end of a penholder or a similar blunt-pointed instrument. The gauze should be packed in firmly, filling the back part of the nostril first and gradually working forward. One end of the strip should be left out of the nose in order to facilitate its removal.

SHOCK.

After a severe accident the patient almost always goes into a peculiar mental and physical condition, which is called *shock*. This condition may immediately follow the injury or may not develop for some time.

Symptoms of shock.—The face is pale with a dull expression. The skin is cold and covered with a clammy perspiration. The pulse is weak and rapid. It may be impossible to feel the pulse at the wrist. The patient is usually conscious but is in a peculiar state of mental indifference, lying with the eyes partially closed and making no effort to move. He may respond to questions, but no dependence can be placed on the truth of his statements. He rarely feels pain and seems to be indifferent to his fate. The breathing is rapid, irregular, and shallow, sometimes gasping. Under suitable treatment recovery from the condition may be expected, but in severe cases shock may continue and death follow.

Treatment.—The symptoms of shock give a fairly clear idea as to what the treatment should be. The body is cold, hence it should be

warmly covered, the patient lying in a recumbent position with the head low. External heat should be immediately applied by means of bottles, jugs, or other containers filled with hot water. These should be placed alongside of and between the legs and around the feet. In emregencies hot bricks or even hot stones can be used. Great care should be taken that the patient is not burnt by these appliances, however, and they should be well wrapped. The heart is weak, hence stimulants should be given. The best of these for shock is probably a small quantity of very strong hot black coffee. Aromatic spirits of ammonia, one-half a teaspoonful in a half tumblerful of water, is also another excellent remedy. Very small quantities of warm soup or milk are sometimes useful. Atropine sulphate in doses of 1/100 of a grain is highly recommended. Do not repeat oftener than every three hours. Liquor in shock is of questionable value. *If no other stimulants are available*, however, a moderate-sized drink of whisky may be given in warm water.

Unconscious patients can not be given stimulants by the mouth, in which case smelling salts can be held under the nose, or a few drops of ammonia water sprinkled on a handkerchief and the patient allowed to inhale the fumes at intervals a minute apart.

In case a patient who has shock is found to be bleeding freely, the first indication is to stop the hemorrhage, and this must be done regardless of his condition, as there is no hope of recovery as long as the loss of blood continues.

BANDAGES AND BANDAGING.

Bandages are generally made of muslin or gauze. There are three principal varieties of bandages in common use—the roller bandage, triangular bandage, and the many-tailed bandage.

ROLLER BANDAGE.

These bandages are composed of long, narrow strips of muslin or gauze. The gauze roller bandage is the better because it has considerable elasticity and is easier to fit to the part. The use of roller bandages requires some training and considerable practice. It is not difficult, however, to apply a roller bandage to the finger, wrist, or the knee joint.

METHOD OF APPLYING ROLLER BANDAGES.

Having selected the proper size, hold the bandage in the right hand. Place the free end of the bandage on the part and prevent it from slipping with the forefinger or thumb of the left hand. The bandage is wrapped around the limb, passing from the operator's left to right, as it goes across the front. On bandaging the trunk or upper parts of the extremities, it is necessary to pass the bandage from the right to the left hand in going behind.

If the part to be covered is of the same diameter all the way up, the bandage is simply wound around the limb or body, each turn

FIG. 189.—Circular bandage. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

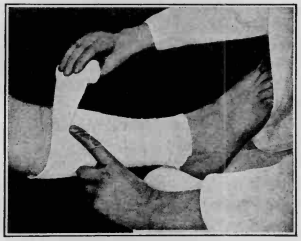

FIG. 190.—Method of making the spiral reverse bandage. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

FIG. 191.—Fastening a bandage by splitting the ends.

overlapping the preceding one by about two-thirds of its width. If the part increases in diameter as the bandage ascends, as, for instance, the calf of the leg, it is necessary to make a half turn or fold

with the bandage at each revolution where the limb becomes larger. To do this, the thumb or forefinger of the left hand is placed on the bandage in the front of the limb and the bandage given a half turn on itself, making it point in a downward direction instead of upward. The reverse is repeated at every turn until the greatest diameter of the limb is passed, when ordinary circular turns may again be resumed.

Roller bandages should be applied firmly, but neither too tightly nor too loosely. If they are too tight, they will shut off the circulation and cause considerable pain. If they are too loose, they very quickly come off or will permit the dressing to be displaced from the

FIG. 194.—Figure of eight of the wrist and hand. (From Fowler's Surgery. Courtesy W. B. Saunders Co.)

wound. In using a roller bandage the ends of the fingers or toes should always be left out of the bandage, so that the operator can see if the circulation has been stopped.

THE TRIANGULAR BANDAGE.

The triangular bandage has been much advocated for emergency use and for those who are inexperienced with the roller bandage. This bandage, also called the Esmarch's bandage, comes in the shape of a triangle, being about 36 inches long on the short sides and about 51 inches on the diagonal. Such a bandage makes an excellent sling and also a good tourniquet. It can be used to completely envelop a hand or foot in the case of a crushing injury. Folded up on itself so as to make a strip about 4 inches wide, it is known as the "cravat" bandage, and is useful for holding dressings in place about the head.

The triangle bandage is frequently found in first-aid packets and is sometimes covered with pictures illustrating its use. However, such bandages are generally stiff and difficult to apply snugly.

THE MANY-TAILED BANDAGE.

This is probably the most useful all-around bandage for first-aid work, because it can be applied by anyone who has once seen it used and can be improvised out of materials which are generally at hand. The many-tailed bandage is simply a series of strips of muslin which are tied around the limb, but instead of being entirely separated are

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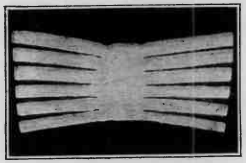
left attached to each other at their middle. This attachment serves to hold them in place and to keep the bandage in position.

To make a many-tailed bandage, take a strip of cloth long enough to go completely around the limb and dressing and provide ends which can be tied. The ends are folded together and notched with



Many-tailed bandage, complete.

scissors or a knife at intervals of about an inch and a half. The cloth is torn at these points almost to the fold but not quite. The bandage is applied by laying it under the limb, straightening out the tails, and tying each tail with its fellow over the dressing in front of the limb. For neatness the loose ends, after they are tied,

Many-tailed bandage, applied.

may be placed under the next one as they are fastened, thus giving the dressing a better appearance. Such a bandage can be easily loosened or tightened as occasion demands, and it can be removed and the dressing changed and the bandage used over again. It can be applied to any part of the body and holds its position well. It should be made out of muslin, old sheeting being excellent for this purpose.

IMPROVISED BANDAGES.

There are certain parts of the body, such as the arm pit, back, and groin, on which it is difficult to retain a dressing. Frequently dressings or compresses can be held in these locations very satisfactorily by pinning them fast to the shirt and then taking up the slack in the underwear by pins on the other side of the body.

A dressing can be quite satisfactorily held in place on the foot or leg by a stocking. The stocking should be rolled up and unrolled over the dressing as it ascends the leg. Pieces of stocking legs make an excellent temporary means of holding dressings on the arm also in emergencies.

PLASTER.

Court-plaster or adhesive plaster should never be applied directly over a wound. Such plasters generally contain germs, and they seal the wound up, preventing the escape of fluid, and causing conditions which greatly favor the multiplication and growth of bacteria. It is permissible to hold a small dressing of gauze in position over a wound by means of a strip of adhesive plaster, as, for instance, on wounds somewhere about the face, but the plaster should never touch the wound directly and there should be enough gauze under it to take up any discharges which may seep out of the injury.

In a great emergency where a physician is not available to treat a large, gaping wound it may be necessary to pull the edges of the wound together with strips of adhesive plaster. If this is done the plaster should be in narrow strips and wide intervals left between for the escape of secretions from the wound.

Before applying strips of plaster in this fashion the skin should be shaved if it is very hairy. Adhesive plaster may be removed without pain by wetting it in gasoline or ether.

MISCELLANEOUS MINOR INJURIES.

BRUISE.

Description.—A bruise is the injury produced by a blow with some blunt object. Bruises are received in two ways—the body may be still and the object moving, as when a boy is struck by a thrown baseball, or the body may be moving and strike against some fixed object, as when a man falls and injures himself on a hard pavement. Bruises are the commonest of all accidents, and everyone has at some time suffered from them.

Treatment.—If the injury is slight, no treatment is required. If more severe, cold-water compress should be applied. To make a cold-water compress take from 6 to 10 folds of old muslin, linen, or such material (a couple of thicknesses of turkish toweling makes an

INTENTIONAL SECOND EXPOSURE

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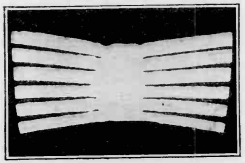

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excellent compress). The dressing should be large enough to cover the injured surface and extend a couple of inches beyond, and should be thick enough to retain the moisture for some time. It is wrung out in cold water and then laid on the seat of the injury. Some covering will be required to prevent the dressing from becoming dry, and also to protect the clothing or bed. The most available material for this purpose is oiled paper. In an emergency an old piece of oilcloth or any flexible waterproof material will do very well. This is put outside of the compress and the whole held in place by a bandage of some sort. The compress may be continued for three or four days, after which rubbing the injured part twice a day with a mixture of equal parts of alcohol and water or undiluted whisky will help to take out the soreness.

BLACK EYE.

A black eye is merely one form of a bruise. As soon as a blow is received in this region a handkerchief wrung out in ice water should be applied. The ice water should be renewed as often as it gets warm, thus combining the effect of both cold and moisture. This treatment should be kept up from half an hour to an hour and may prevent discoloration from setting in.

If treatment is begun after the flesh has become black, hot-water applications for half an hour, three times a day, will hasten the disappearance of the swelling and discoloration. The old-fashioned practice of applying raw beefsteak is not recommended. In all cases where a severe blow has been received in the region of the eye a physician should be consulted, as there is danger that injury may have been done to the eyeball.

STRAINS.

Description.—Strains are the injuries produced by overstretching a muscle. The muscle, in severe cases, may be partially torn or even ruptured. The muscles of the back, shoulder, and wrists are often the seat of strains. A sudden wrench or too great exertion frequently causes a strain.

Symptoms.—Pain which is increased when the part is moved, soreness, and more or less swelling.

Treatment.—Rest, with gentle rubbing with alcohol and water, equal parts; tincture of arnica or soap liniment. Later on the rubbing should be more vigorous, with gentle kneading of the muscles affected. The application of dry heat by means of hot-water bags or bags filled with hot sand will often give relief from pain and help to "limber up" the part.

FOREIGN BODIES IN THE EYE.

Foreign bodies in the eye come under two classes, first those which lodge under the lids and second those which are firmly adherent to the clear part of the eyeball, the cornea, sometimes known as the sight of the eye.

Treatment.—To remove a foreign body from under the lid, first of all determine which lid is affected. To do this, seat the patient on a chair facing a window and pull the lower eyelid down, having the patient look up. If a cinder or other speck is seen, take a clean pocket handkerchief, folded so that it makes a point, and remove the object

FIG. 242.—Eversion of the upper lid, step one.

FIG. 243.—Eversion of the upper lid, step two.

with the point. Wetting the tip of the handkerchief with clean water will sometimes assist the process of removal.

If nothing is seen on the lower lid, it will be necessary to evert the upper lid. To do this take a match, lay it across the lid, holding it in one hand, grasp the eyelashes with the fingers of the other hand, *have the patient look down*, and turn the lid upside down by pulling the lashes up over the match. The lid may be held in this position by the left hand and the foreign body removed with the handkerchief as described above. If it is very firmly embedded, a clean toothpick may be used to loosen it from the flesh.

FOREIGN BODIES IN THE NOSE.

Children occasionally slip beans and other similar objects into the nose. The bean may swell, making an effort to dislodge it particularly difficult. Sometimes these bodies may be removed by closing the other side of the nose and having the child blow the nose vigorously. Another device worthy of trial is to cause the child

to sneeze by tickling the nose with a feather. Occasionally, if the object is readily seen, an attempt to remove it may be made by bending a hairpin slightly and attempting to insert the curved end alongside the object, holding the points in the fingers. These cases generally require the services of a physician, and they should always be taken to a doctor in case the simple treatment above described is not successful.

FOREIGN BODIES IN THE EAR.

Various foreign bodies are occasionally introduced into the ears and may be the source of a great deal of discomfort and pain. An insect in the ear may be removed by turning the head to one side and filling the ear with warm sweet oil poured into it by means of a spoon. The oil will suffocate the insect and it will float out. For the removal of other objects a physician should in all cases be employed, as a great deal of harm can be done by inserting sharp instruments into this cavity. Occasionally a small object may be removed by a gentle syringing with warm water.

FOREIGN BODIES IN THE THROAT.

The beginning of the throat is known as the pharynx. Lower down there are two passages, one of which leads to the stomach, called the gullet or esophagus. The other leads to the lungs, and is known as the larynx at the upper end, lower down the windpipe or trachea. Foreign bodies may lodge in any of these passageways. Commonly such objects are articles of food, but other things which have been held in the mouth—like coins, safety pins, or marbles—may accidentally slip back and lodge in the throat. Young children are especially apt to put any small articles which they get into their hands into their mouths, and occasionally they attempt to swallow them, with disastrous results.

Foreign bodies in the pharynx.—Large foreign bodies in the pharynx cause great interference with breathing. They can generally be removed by opening the mouth and pulling the object forward by means of the fingers or by hooking the index finger behind it.

Treatment.—Place the patient on a chair facing the light, open the mouth, and hold the tongue down with the handle of a teaspoon. It may be possible in this way to see the object and to extract it. Inversion can be tried in the case of a child and the same effect produced in an adult by having him lie crosswise on a bed on his abdomen with his head and shoulders hanging over the side. Failing to remove the obstruction in this way, send for a doctor at once.

Foreign bodies in the gullet—Symptoms.—When an object lodges in the gullet the patient has pain, difficulty in swallowing, and breathing may be interfered with. Occasionally the symptoms may be slight, but more often the object produces inflammation.

Treatment.—The treatment is the same as advised for foreign bodies in the pharynx.

NOTE.—If a child or adult has swallowed some sharp or pointed article like a piece of broken glass or a pin, give him a diet composed largely of mashed potatoes and bread. Encourage him to eat as much as possible of these articles for several days. They will surround the foreign body in large masses and prevent it from injuring the walls of the intestine. Do not give purgatives at once, but after the bread-and-potato diet has been taken for two or three days a mild laxative may be given. Watch the passages carefully for several days to be certain that the object has been passed. Such cases should always be under the care of a doctor when he is available.

Foreign bodies in the larynx—Symptoms.—When a foreign body enters the upper part of the windpipe it immediately sets up a violent attack of coughing which frequently results in its expulsion. A small article may, however, remain in the windpipe and gradually work its way lower to some point in the lung where it remains permanently, causing a continual inflammation characterized by cough, with foul and blood-streaked expectoration. If the object is large it may completely close the passage and prevent the entrance of air to the lungs and threaten death by suffocation. In such cases a patient becomes black in the face and makes frantic struggles to secure air.

Treatment.—If the patient is a child, he should be picked up by the feet and held suspended with the head downward, which may cause the object to fall out by its own weight. Failing in this, if the symptoms are not alarming, endeavor to quiet the sufferer and send for a doctor at once.

SPRAINS.

Sprains are the inujries produced by wrenching or twisting a joint. Sprains of the ankle, wrist, shoulder, and knee are very common. Severe sprains should always be treated by a doctor, if possible. There was an old saying that bad sprains were worse than fractures. As a matter of fact, many of these "sprains" were in reality small or partial fractures near the joint, especially when involving the ankle. In severe sprains of the shoulder, wrist, or ankle an X-ray examination of the affected part should always be made if it is possible to do so. Sprains of the ankle in which extensive areas of black and blue skin are observed, extending for a considerable distance up the leg, are almost always accompanied by fractures.

Symptoms.—Severe pain, always increased by motion of the joint, and hence there is often apparent lack of ability to move the limb. Swelling and sometimes redness, later on possibly discoloration.

Treatment.—Absolute rest to the joint. If at the wrist or shoulder, put the arm in a sling. If a knee or ankle is involved, put the patient

in bed and rest the joint on a pillow. Apply cold water compresses, using a thick dressing large enough to wrap completely around the joint and extend well above and below it. Hot-water compresses may be used if more agreeable to the patient. Continue the compresses until the pain and swelling subside. This may require from two to five days. Then cautiously begin rubbing with alcohol diluted with an equal amount of water or tincture of arnica. Later, in addition to the rubbing, which should become gradually more vigorous, begin gently moving the joints by grasping the hand or foot and moving it in various directions. These motions should be made by the operator and not by the patient. The injured person should exercise great caution in beginning to use the part.

DISLOCATIONS.

Description.—When one of the bones is forced out of its proper place in a joint and remains permanently out, the injury is known as a dislocation. These accidents tear or stretch the ligaments, and even if properly treated the joint is apt to be weak afterwards and will slip out of place more easily a second time. The shoulder joint is more frequently dislocated than any other joint in the body.

Causes.—Dislocations are usually the result of falls or severe accidents.

Symptoms.—Pain, inability to move the joint in the usual manner, the appearance of the joint differs from the sound one on the other side, the end of the displaced bone may be felt to be in an improper position when compared with its uninjured fellow, and swelling may occur shortly after the injury has been received.

First-aid treatment.—Always send for a physician if one is available. Pending his arrival apply cold water compresses to the joint and put the part at rest by placing the arm in a sling if it is in the upper extremity or by having the patient lie down and rest the injured member on a pillow if the accident has happened to the lower extremity. This is all that need be done until the arrival of the surgeon under ordinary circumstances. It is difficult to reduce most dislocations, and considerable harm may be done by inexperienced persons in their attempts to do so.

FRACTURES.

When the bone is broken and there is no wound, the injury is known as a *simple fracture*. If the skin is broken and there is a wound leading down to the ends of the bone, it is called a *compound fracture*. The student should remember that a compound fracture, then, is one in which the fracture is compounded by a wound. A *compound* fracture is *not* a fracture in which the bone is broken in more than one piece without a wound. Such fractures are called

comminuted fractures. Briefly, then, a *simple* fracture is one without a wound, a *compound* fracture is one with a wound. The distinction between these two varieties of injury is very important, because, while most simple fractures unite without difficulty or grave symptoms, compound fractures, on the other hand, on account of the open wound frequently become infected with pus germs. Active suppuration follows, which involves the bone, and a long time is required for recovery. Hence, compound fractures are very serious injuries and may even at times prove fatal. Every effort should therefore be made to prevent a simple fracture from becoming compound. As above explained, if the patient is carelessly moved, a sharp bit of bone may be easily forced through the flesh and skin and the simple fracture be converted into a compound fracture by injudicious handling. To prevent this accident splints or some sort of appliance should always be placed around broken bones before the sufferer is moved.

In case a man has received an injury and fracture is suspected, there being great pain, more or less loss of motion, possibly numbness in the fingers or toes, it is always wiser in first-aid work to assume that there is a fracture present and treat the case accordingly until medical help is available. Splints can be improvised almost anywhere and it will do no harm to put the injured member on a splint and take the patient to a physician, even if there is actually no fracture, whereas if there is a fracture and this precaution is omitted great damage may result, because an unprotected simple fracture may be converted into a compound one during the journey.

First-aid treatment of simple fracture.—Before taking up the treatment of fractures it is necessary to describe emergency splints.

When a fracture is suspected, lay the limb on a folded blanket, coat, pillow, or other flat, soft object while splints are being prepared.

Splints are used to prevent motion of the ends of the broken bone while the patient is being transported, and later on to hold the fragments in proper position and prevent motion while they are healing. Union can not take place if there is motion at the seat of a fracture.

Emergency splints can always be devised from some material at hand. Light boards from broken boxes make excellent splints. Two or more pieces may be nailed together in order to get one strip of sufficient length. Heavy corrugated pasteboard is frequently used, also sections of tin gutters and properly shaped strips of tin. Other articles which suggest themselves are fence pickets, laths, umbrellas, canes, rifles, and even bundles of twigs. The material selected should be sufficiently rigid to support the weight of the limb and hold it immovable.

The splints must be padded on the side which goes next to the flesh, as otherwise they are extremely painful and may seriously damage the skin. Cotton is the best material for padding, but other substances, such as waste, pieces of old cloths or quilts, excelsior, straw, grass, moss, etc., may be used. Special attention should be given to padding the end of the splint which will come against the body. Splints should be wide enough to give firm support; in the case of a forearm or leg, as wide as the part itself. Emergency splints can be applied over the clothing, which will help to cushion them and protect the part.

Applying splints.—In applying splints great care must be exercised in moving or handling the injured part. Both fragments of the broken bone must be supported when it is lifted or its position changed. When one splint is in place endeavor to overcome obvious deformity and get the part into a natural position by a very gentle manipulation. Then adjust the other splint and fasten them to the limb.

Swelling very promptly follows most fractures and the limb is very painful and tender to touch. If the swelling is marked it is customary to remove the emergency splint as soon as the patient arrives home or at the hospital and to place the limb on a pillow and apply cold-water compresses or compresses of leadwater and opium for three days. Lead and opium wash is prepared by taking one-half of an ounce of tincture of opium and one-half of an ounce of liquor plumbi subacetatis. These two are mixed together and then this mixture is added to a pint of water, making the well-known leadwater and opium. This solution is much used in the treatment of bruises, sprained joints, and recent fractures where the skin is not broken. Gauze, towels, or similar material are rung out in the fluid and applied in the same manner as wet dressings. The remedy is poisonous, however, and should be kept out of the reach of children and never taken internally. After the swelling has somewhat subsided the permanent splints are applied. It is advisable to reduce the fracture and apply the permanent splints as soon as possible, because the longer this is postponed the more difficult it will become to get the bones into proper position.

FRACTURES OF THE FINGERS.

Symptoms.—It is generally possible to obtain crepitus by gently rotating the ends of the fingers.

First-aid treatment.—All that is necessary is to place the hand in a sling pending medical attention.

After treatment.—Make a light wooden splint of cigar-box wood or similar material the width of the finger and long enough to extend from the end of the finger well into the palm. Pad and apply (fig. 261). Keep the splint on for three weeks, and keep the hand during this period in a sling to avoid bumps and jars.

FRACTURE OF THE BONES OF THE HAND.

Symptoms.—Usually crepitus can be detected by carefully manipulating the suspected bone.

First-aid treatment.—Place the hand in a sling. The other bones will act as a splint.

After treatment.—Lay the hand on a splint which extends from the ends of the fingers half way up the wrist. Pad it well and place a large ball of padding where the palm will rest. Lay the hand and forearm on the splint and put it in as good a position as possible. Fasten the hand to the splints with a roller bandage or a many-tailed bandage. Then place the hand in a broad sling. Keep the splint in position for three weeks, beginning passive motion of the fingers at the end of the second week.

FRACTURE OF THE WRIST.

This is very often produced by a fall on a slippery pavement, the patient striking the ground with the palm of the hand in his effort to save himself.

Symptoms.—Marked deformity and numbness of the fingers.

First-aid treatment.—No splint will be required in most cases, it being sufficient to place the arm and hand in a broad sling until a physician can be secured.

FRACTURES OF FOREARM.

The arm extends from the shoulder to the elbow; the forearm from the elbow to the wrist. There are two bones in the forearm. Either one of these bones may be broken or both. When only one bone is broken the other acts as a splint and the symptoms of fracture may not be clear. In cranking an automobile, if the motor backfires the crank will be violently whirled around in the reverse direction and frequently causes fracture of the forearm of the operator.

FRACTURE OF BOTH BONES OF THE FOREARM.

Symptoms.—Pain, inability to turn palm upward and downward, possibly grating, false motion.

First-aid treatment.—Bend the forearm to a right angle with the arm. Apply two padded emergency splints extending from the elbow to the knuckle. Lay the forearm and the hand on the lower splint, gently straighten the part as well as possible, and place the other splint on the back of the hand and arm. Fasten in place the bandage or strips of muslin and support the arm and hand in a broad sling.

FRACTURE OF THE ARM.

Fractures of the arm are common, but it is sometimes difficult to get union.

Symptoms.—Pain, shortening, inability to move the arm, and sometimes crepitus and false motion may be detected. The appearance of black and blue spots on the arm after an injury in places which have not been bruised themselves should suggest the likelihood of a fracture.

First-aid treatment.—Place a broad wedge-shaped pad between the chest and the arm long enough to extend from the arm pit nearly to the elbow. The edge of the wedge goes into the armpit (fig. 269). This pad may be constructed of towels or even folded newspapers wrapped in some soft material. It is held in place by a band or strips going over the opposite shoulder. The pad gives a firm, straight surface to support the arm on the inside. Apply three short, narrow padded splints to arm running from the shoulder to the elbow, one on the outside, one behind, and one in front. Hold the splints in place with a many-tailed bandage or three strips of muslin. Fasten the arm to the chest with a bandage going around the rest of the body or with strips of adhesive plaster or a towel pinned in place. Place the forearm in a sling and use a narrow sling supporting the wrist only.

FRACTURE OF THE SKULL.

Fracture of the skull may occur at the top or vault of the skull, or the lower part, when they are known as fractures of the base of the skull.

Fractures of the skull are serious injuries and may be due to blows, falls, or other accidents.

Fracture of the upper part of the skull can often be felt by running the finger over the scalp, the depression in the bone being easily detected. The gravity of fractures in this location depends largely on the damage done to the brain and blood vessels. If large arteries have been ruptured inside the skull the blood pours out and compresses the brain, giving rise to symptoms of brain compression.

FRACTURES OF THE BASE OF THE SKULL.

Fractures of the base of the skull are generally compound, the wound not being visible, but in the nose, pharynx, or ears. They are of course very dangerous injuries.

Symptoms.—There may be partial or complete loss of consciousness, bleeding, or the escape of blood-stained fluid from the nose or ears and paralysis of the face. Later the symptoms of compression may be developed such as paralysis, slow stertorous breathing, unequal pupils, etc.

First-aid treatment.—Send for a doctor at once. Raise the head on a pillow or folded coat. Treat shock by applying hot-water bottles, jugs filled with hot water, or hot bricks around the feet and body. Be careful not to burn an unconscious patient. *Do not give whisky or other stimulants.*

FRACTURE OF THE COLLAR BONE.

Fracture of the collar bone is frequently due to a fall in which the person strikes with the weight on the hand.

Symptoms.—The patient generally supports the injured arm with the other hand. It is easy to detect a fracture of the collar bone, because the bone is placed directly under the skin and the deformity may be seen or felt. Always compare with the other side. Stand behind the patient with his clothing removed and grasp the collar bone on each side between the fingers. Make gentle motion. It will be found that the bone on the injured side can be moved and on the other side it is rigid.

First-aid treatment.—Make a pad of towels, newspaper, or other flexible material and place in between the arm and the side in the armpit. Keep the pad in position by straps going over the opposite shoulder. Bind the arm to the side by bandages, a towel, or strips of muslin, and then make a sling which specially supports the point of the elbow so as to raise the elbow up.

FRACTURE OF THE RIBS.

These injuries are often due to kicks in the side from heavy boots with the person lying on the ground. They may, however, be due to direct violence of all kinds.

Symptoms.—Pain which is likely to be sharp and stabbing, when the patient takes a deep breath or when he coughs. It may be possible to detect unnatural motion in a broken rib by carefully running along its course from the backbone to the breastbone and making pressure.

First-aid treatment.—Wrap a strip of muslin or a towel around the chest tightly and pin it. Support with straps running over the shoulders.

BROKEN NECK OR BACK.

Contrary to common belief, it is possible for a person with a broken neck or back to recover and live for many years. These injuries, however, generally severely damage the spinal cord, which is inclosed in the backbone, and more or less permanent paralysis results.

Symptoms.—Inability to move the legs. Loss of feeling in the members which are affected. If a severely injured person who is conscious can not move his legs, always suspect fracture of the back.

First-aid treatment.—The first-aid treatment of a broken back is very important, for if the injury is high up and the patient is roughly moved, the sharp edges of the broken bones may crush or compress the spinal cord to such an extent that instant death results. Therefore, if circumstances permit, do not move the patient at all pending the arrival of a doctor. If it is impossible to secure a physician, the patient should be lifted or moved only on a blanket or sheet supported at the four corners and the sides.

FRACTURES OF THE LOWER EXTREMITIES.

The thigh extends from the knee to the hip and the leg from the knee to the ankle.

Symptoms.—If the ends of the bone are driven together, as they sometimes are, especially near the hip joint, the symptoms may be very slight, and it will be difficult for the inexperienced to tell whether there is a fracture or not. All fractures in the middle part of the bone will give the following symptoms:

Pain, inability to stand on the injured leg, shortening, and it will be noted that the toe on the affected side falls out. When it is placed in its natural position it again drops in a helpless manner.

First-aid treatment.—Call a doctor. Apply a long splint on the outside of the affected leg extending from the heel to the armpit. Pad it on the side toward the body. Apply another splint on the inside of the leg, extending from the crotch to the heel. Fasten these splints by at least three strips of muslin or similar material around the body and five around the leg and thigh. These strips should be placed under the patient before the splints are applied. In lifting the thigh for this purpose have one assistant carefully support both ends of the broken bone and another the foot when the broken extremity is lifted from the ground. The leg should be carefully lifted by one person when the patient is being placed on a stretcher. Treat shock if it is present.

FRACTURE OF THE KNEE CAP.

Symptoms.—The patient can not stand and is unable to raise the limb from the ground. Very often separation of the two pieces of bone may be felt by the fingers if the case is examined before swelling has set in.

Treatment.—Make a splint about 3 feet long and 4 inches wide. Pad it well and place it under the thigh and leg. Fasten it in place with a number of handkerchiefs, strips of muslin or a bandage.

FRACTURES OF THE BONES OF THE LEG.

The leg extends from the knee to the ankle joint and contains two bones. The larger bone of the leg is called the tibia. The other bone is long and slender and placed to the outer side, called the fibula.

Either or both of the bones of the leg may be broken. If only one bone is fractured the other acts as a splint and it may be difficult to make a correct diagnosis of the injury.

FRACTURE OF BOTH BONES OF THE LEG.

Symptoms.—The patient is unable to stand. There is generally deformity and false motion. Crepitus may be detected.

First-aid treatment.—Apply two well-padded splints to the sides of the legs extending from well above the knee to below the heel. Fasten in place with five strips of bandage or muslin. If a pillow is available, lay the leg on the pillow. Bring the sides of the pillow up around the leg and tie them in place with strips of muslin or bandage. A folded blanket may be used in place of a pillow. Two side splints may be now placed, without padding, on the outside of the pillow or blanket. If no other appliances are available, the injured leg may be fastened to the other leg with strips of bandages or hand kerchiefs, the sound limb acting as a splint.

POTT'S FRACTURE.

A fracture of the outer bone of the leg—that is, the fibula—a few inches above the ankle is known as a Pott's fracture. It is a very common injury.

Symptoms.—The foot points outward and there is unnatural motion at the ankle joint.

First-aid treatment.—The same as described above for fracture of both bones of the leg.

FRACTURES OF THE BONES OF THE FOOT.

These are usually due to direct force and are often compound.

Symptoms.—There is a great pain in the foot on attempts to walk, and crepitus may be produced on gently manipulating the injured bone.

First-aid treatment.—The other bones act as splints and usually nothing will be required except to lay the foot on a pillow.

FRACTURES OF THE TOES.

First-aid treatment.—A light splint may be applied to the sole of the foot, but usually no splint will be necessary.

COMPOUND FRACTURES.

Compound fractures have already been described as fractures which are complicated by wound extending down to the broken bones. It is possible to break a bone and receive a wound of the skin or a wound in some other part of the limb, but if the wound does not communicate with the fracture it is not a compound fracture.

Symptoms.—The symptoms are the same as those of any other fracture, with the addition of the wound. In severe cases the end of the broken bone may come through the wound and project on the outside.

First-aid treatment.—The great aim of the treatment of compound fractures is to prevent bacteria getting into the wound. If pus germs gain admission there will be a great deal of swelling and inflammation and finally suppuration. The healing of the fracture will be prolonged for many weeks, and sometimes there is so much destruction of the bone by inflammatory processes that healing does not take place at all until surgical measures are employed. Therefore, in a compound fracture, always cover the wound with a sterile dressing at the earliest possible moment. After the wound has been covered, splints may be applied as in the manner already described. In case a sterile dressing is not available, the wound should be allowed to remain exposed to the air while one is being prepared. A suitable dressing made of muslin or toweling may be folded into shape and boiled. After this dressing has been placed on the wound and fastened in place then apply the splints.

If one of these bones is sticking out through the flesh, the question arises as to whether it is wise to attempt to restore it to its natural place. If a doctor can be obtained in a short time, make no such effort, but apply the dressing over the open wound and prevent further motion of the fragments as well as may be with the splints. If the patient will have to be transported for a considerable distance before he can reach medical help, it may be proper to attempt to replace the bone by pulling on lower end of the limb in the direction of its long axis. Before doing this, in all cases, the wound and the protruding end of the bone should be thoroughly painted with tincture of iodine and all visible dirt removed from the bone, so as to lessen as much as possible the danger of dragging live bacteria into the deeper tissues. If tincture of iodine is not available, do not attempt to replace the protruding fragments.

SUNSTROKE.

The term "sunstroke" denotes a sudden attack of illness from exposure or prolonged exposure to the rays of the sun; but the same condition may be produced in hot weather by exposure to high temperature not in the direct rays of the sun, particularly if the person is engaged at hard work in close quarters. Stokers on steamships are sometimes affected by the heat of the furnace. Men debilitated from or addicted to the excessive use of stimulants are more apt to suffer than those of temperate habits.

Sunstroke occurs in two forms: Heat stroke (heat fever), in which the temperature of the body is very high, and heat prostration or

heat exhaustion, in which the surface of the body is cool, sometimes considerably below normal. The difference is very important because of the different treatment required.

In severe cases of heat stroke the patient may be stricken down in a state of unconsciousness and die instantly, or within an hour or two. In other cases there may be intense headache, dizziness, marked restlessness, nausea and vomiting, and hot "burning" skin. The thermometer may register 105° F. Pulse is full and may be slow or fast. Breathing is labored—may be sighing or rattling. Patient soon becomes unconscious, the stupor deepens, and death may occur within 24 hours; or the temperature may drop, consciousness may return, and the patient get well.

In heat prostration, as already stated, the surface of the body is cool, the pulse rapid and feeble, and there is a feeling of general weakness. There may be only slight faintness and nausea, and under prompt treatment patient may rapidly recover, or, on the other hand, there may be complete loss of consciousness and a rapid and fatal termination from exhaustion.

Heat cramps.—Painful spasms of the muscles, especially those of the abdomen and limbs, may occur when persons who are exposed to high temperatures are required to perform hard labor. Stokers on steamships are liable to suffer from them. They are extremely painful, making the patient cry out; there is headache, and the bowels are constipated. In some cases the patient is unconscious, and the convulsions resemble those of epilepsy. The attacks may last from 12 to 24 hours, but even after the patient becomes quiet the spasms may be renewed by a slight stimulus, such as a cold draft or a sudden movement. The muscles are sore and the patient weak and listless for several days following the seizure. The cases vary greatly in intensity; there may be simply a slight cramp in the abdomen or in one of the muscles of an extremity.

Prevention.—The temperature and humidity of inclosed places like firerooms of ships, weaving rooms, etc., should be regulated, so as to prevent the temperature of the air from rising above 86° F. and the moisture 80 per cent. This may be accomplished by the use of fans to keep the air in motion. Cold air may be forced into these places or hot air exhausted by the same means.

Treatment.—In heat stroke (fever heat) the temperature of the body should be reduced as rapidly as possible. Place the patient in a cold-water bath, add ice, rub the body with the blocks of ice, apply ice water with ice cap to his head, and keep up the treatment until the temperature, as shown by the thermometer in the rectum, is reduced to 100° F. If the temperature rises again, repeat the treatment. If symptoms of exhaustion follow the reduction of the

temperature, stimulants should be given—strychnine sulphate, one-fortieth grain.

In heat prostration, with cool skin, weak and rapid pulse, stimulants and friction are required. Give strychnine sulphate, one-fortieth grain, rub the surface of the body and the extremities, place hot-water bottles to the feet, and cover the body with blankets. If the head is hot, apply cold water to the forehead. If vomiting occurs, inject hot salt solution (one teaspoonful of salt to a pint of water) into the rectum. Apply a mustard plaster over the region of the stomach. Mustard plasters may also be applied to the feet.

EFFECTS OF HEAT AND COLD.

SUNBURN.

Sunburn is a red and painful condition of the skin due to exposure of the surface of the body to the rays of the sun.

Treatment.—Make a lotion as follows: Take one-half a pint of hot water and stir into it a level tablespoonful of boric-acid powder; then add 20 drops of carbolic acid, and shake well. The solution should be dabbed on the inflamed skin with a small piece of cotton or sprayed on with an atomizer. It should not be rubbed into the skin. It can be applied every half hour if necessary. If no medicine is available cold compresses will give relief to badly burned areas.

BURNS AND SCALDS.

Treatment.—Of slight or small burns or scalds.

As soon as the injury is received plunge the part in cold water, preferably ice water. This checks the action of the heat and instantly stops the pain. If boiling water or soup is spilled over the leg or foot, do not wait to remove the clothing but thrust the entire part into a bucket of water or pour cold water freely over it. Keep submerged in cold water, or covered with a cold-water dressing, which is frequently renewed for 20 minutes to a half hour, depending upon the severity of the injury. Then apply a permanent dressing. There are many ways of treating burns, all of which have their advocates.

A very satisfactory dressing is plain vaseline or petrolatum molle. This is spread with a knife on clean pieces of old muslin, gauze, or similar material, just as butter is spread on bread. The prepared cloth is then cut into strips and the strips laid on the burns "buttered" side down. The plan of using several or more small strips is better than applying one large piece, as the smaller dressings come off much more easily when the burn is re-dressed. A thin layer of cotton may be applied over the muslin or gauze to protect the part from injury and the entire dressing held in place by a suitable bandage. *Never, under any circumstances, apply cotton directly to a burn.*

A good deal of fluid exudes from a burn, and this fluid will harden in the cotton and cement it firmly to the surface of the wound so that it can not be removed without great pain and interference with the healing process.

Blisters may be opened by a needle, the point of which has been passed through a flame. The dressings should be removed at the end of 24 hours and fresh ones applied. Every household should keep on hand a large jar of vaseline for the purpose of dressing burns. Boric-acid ointment makes a most excellent dressing for injuries of this sort. A substitute is made by thoroughly mixing 1 part of boric acid with 10 parts of petrolatum molle or vaseline. In the absence of vaseline use sweet oil, olive oil, castor oil, or some of the many preparations of liquid petrolatum now so extensively advised for the cure of constipation. In emergencies automobile grease or cylinder oil may be used, but always put the medicine on the dressing and then lay that on the wound rather than to attempt to spread the medicine on the surface of the burn itself. Carbolized vaseline should never be used on a burn, as the carbolic acid, if of any considerable strength, is apt to cause extensive sloughing of the part and deep ulcers, which are extremely difficult to heal. The picric-acid treatment for burns has been highly recommended and is much used, but its use should be restricted to limited burns of a rather mild degree. Some first-aid kits contain picric-acid gauze, which is first wet and then applied as a compress. Carron oil was formerly much used and is composed of equal parts of linseed oil and limewater. It is not as good as vaseline or petroleum molle and has the objection of soaking through the dressings and soiling the bed or clothing.

SEVERE EXTENSIVE BURNS.

First-aid treatment.—These require the attention of a physician if available. Such injuries are always accompanied by shock and they should be treated by absolute quiet, covering the patient with blankets or warm clothing, applying hot-water bags and the administration of stimulants such as hot strong black coffee, half a teaspoonful of aromatic spirits of ammonia in a little water, or one large drink of whisky. It may be necessary to give one-fourth grain of morphine sulphate or some preparation of opium to allay the pain. Do not place horse blankets next to the skin on account of the danger of lockjaw.

BURNS FROM CHEMICALS SUCH AS STRONG ACIDS OR ALKALIES.

These substances, when coming in contact with the skin, frequently cause burns similar in many respect to those produced by heat. The chemical should be immediately washed off as quickly as possible with a stream of running water. It is rarely advisable to

attempt to counteract the substance with some other chemical, as the proper materials for this purpose are not often at hand, and if freely flowing water is used the same effect can be produced in this manner. After prolonged washing dress the burn in any of the methods as described above.

ELECTRIC BURNS.

When a person comes in contact with a live electric wire, severe and deep burns are frequently produced.

Treatment.—Electric burns should be dressed for several days with wet dressings of boric acid solution, afterwards with dry gauze lightly spread with vaseline. Such burns are always very slow in healing.

Prevention.—All parts of the body should be kept as dry as possible, as dampness increases the tendency to frostbite. The shoes should be large, and puttees or leggings should be worn loose in order not to impede the circulation of the blood. Tight garters must not be worn. It is well to wear two pairs of stockings, a woolen pair over a cotton pair. The ears and the face, except the eyes, nose, and mouth, should be well covered, especially if snow is falling or a brisk wind is blowing. Fur-lined gloves are warmer than woolen ones. Special care should be taken of the feet; they should be washed each day and a small quantity of oil should be rubbed into them. A large amount of oil does harm; only enough should be used as can be well rubbed in, leaving a dry surface when the rubbing is completed. Clean stockings should be put on each day. Wet stockings should be changed for dry ones. If a person has to be on duty with wet feet, an opportunity should be afforded him to put on dry stockings at least every six hours. The feet are less likely to become frostbitten if a person keeps moving. If he has to stand in one place shoestrings and puttees should be loosened.

Treatment.—If a physician is present, his instructions should be followed. If the frostbite is of the first degree—that is, if the tissue is only slightly frostbitten—the part should be gently rubbed, and cloths wrung out of cold water should be applied. Snow may be rubbed on the part, but it is not as efficient as cold cloths. The rubbing and the applications should alternate, rubbing a few minutes, and then applying cloths for a few minutes. The temperature of the water in which the cloths are soaked should be gradually raised until it is lukewarm. In frostbites of the second degree—that is, where the skin is of a livid hue and blisters have formed—no rubbing should be practiced, as there is danger of increasing the damage. Cold cloths should be applied, but the cold must not be kept up too long, as cold prolongs the cause of the injury. The temperature of the water should be gradually raised a degree or two every few minutes, using fresh cloths each time the temperature of the water is changed. It should be remembered that reaction takes place naturally as soon as the person is brought into the house out of the cold, even if he is treated in a cold room, and the object of treatment is to prevent this reaction from taking place too rapidly and at the same time not unduly retard the restoration of vitality. In frostbites of the third degree the same method should be followed to bring about a reaction as in those of the second degree; reaction, however, will not happen in a part that is dead, but the adjacent living tissue will react, and a red line will form between it and the dead portion.

In some cases reaction has already taken place when the person is first seen. In these cases the above treatment is unnecessary. After reaction has occurred the patient should be moved into a warm room, and an ointment composed of vaseline 1 ounce, camphor 6 grains should be applied. The part should then be surrounded with absorbent cotton or wrapped in flannel cloths. Boracic acid ointment may be used instead of the vaseline and camphor. Blisters that form should be pricked with a needle and the water allowed to flow out, but the covering of the blisters should not be disturbed. If gangrene occurs, cloths wet with alcohol placed over the part prevent infection and hasten the separation of the dead part from the living tissue.

A person who has been exposed to a low temperature or submerged in cold water should be placed in a cold room, and artificial respiration should be performed. The extremities should be rubbed with a solution composed of equal parts of alcohol and water. When the patient begins to react, the temperature of the room should be slowly raised, and the patient should be given hot drinks, coffee, tea, or chocolate. If the patient is unable to swallow, a pint of hot coffee or tea should be injected into the rectum. Efforts to restore animation should be continued for an hour or two, as persons have been brought to life after being apparently dead.

SUFFOCATION.

It is necessary that fresh air should be constantly entering the lungs and used air expelled if life is to be maintained. When this process is stopped or markedly obstructed, suffocation results.

Most cases of suffocation are treated by removing the direct cause and performing artificial respiration. To do this properly, the operator should have some knowledge of the system.

The Schaefer method.—The collar is removed and shirt band loosened. The patient is laid on the ground, face downward. The arms may be raised about the head, one arm flexed, so that the forehead rests upon it. The face must be turned slightly to one side, so that the nose and mouth will not be closed by pressure

against the ground. The operator stands or kneels astride of the patient and places his hands close together, one on each side of the backbone at about the region of the short ribs—that is, about the middle of the body. The operator now leans forward and throws his weight on this hands, which are against the back, thus pressing the lower part of the chest against the ground and also to a certain extent forcing the belly contents up against the diaphragm. The effect of this double procedure is to decidedly diminish the capacity of the chest and air is forced out. The pressure is applied firmly but gently, and then removed by the operator bending his body backward and taking the weight off his hands. The removal of pressure causes the chest to expand and the organs of the abdomen to recede by their own elasticity, and this expansion of the chest cavity draws air into the lungs through the windpipe. The operator pauses for about three seconds to allow the fresh air to become mixed with the blood and then repeats the process. These alternate procedures of compressing the chest and then relieving it and pausing for three seconds are continued rhythmically until the patient begins to breathe himself. The movements are performed at the rate of about 12 to 14 times per minute. It takes about a second before the air is all out and a second for it to enter, and the three seconds' pause makes it a total of five seconds for the complete cycle. The hands should remain in the proper position upon the back after the pressure has been removed, but no weight should be placed upon them. The operator swings his body backward and forward with the least possible exertion, and on this account is able to keep up the movements for a long time without undue fatigue. It may be necessary to perform artificial respiration for several hours, or even longer. In rare instances it has been kept up more or less continually for several days. In any event, it should be tried for at least an hour and a half. A good rule is that artificial respiration in suffocation cases should be performed until it is certain that the individual is dead, and then continued for an hour and a half longer. Many persons who were apparently lifeless have been finally restored by long-continued efforts.

When the air enters and leaves the chest it makes a very audible sound in passing through the paralyzed throat. If this sound is not heard it may be inferred that the method is not being properly applied.

When the patient begins to breathe voluntarily in a regular manner, he should be turned on his back and suitable measures toward keeping him warm applied. Later on when he is conscious and can swallow, stimulants are administered such as hot black coffee or aromatic spirits of ammonia. The limbs should be vigorously rubbed toward the heart to assist in restoring the circulation and bringing up the

body warmth. If vomiting occurs, turn the head to one side so that the vomited matter will run out of the mouth and not get back into the lungs. When breathing is fully established and the general condition good, the patient should be put in bed, warmly covered, and if he is cold external heat applied. Care should be taken to see that he has plenty of fresh air.

Various mechanical devices, such as pumps or bellows, connected with face masks or similar appliances, have been devised for the purpose of performing artificial respiration. Many of these machines have been widely advertised and highly recommended. A more extended trial, however, has demonstrated that some of them are not entirely satisfactory and their use is occasionally followed by undesirable complications. Further developments along these lines may succeed in producing an apparatus, however, which will be free from any defects.

After natural breathing begins the patient must be carefully watched because it may fail and artificial respiration be again necessary.

In all cases of suffocation send for a doctor, if available, but do not wait for his arrival before starting artificial respiration. This should be commenced immediately, as a few moments' delay may mean the loss of a life. The method of performing artificial respiration is the same in all cases of suffocation.

Causes of suffocation.—These are submergence of the body in water, the breathing of certain gases, a foreign object in the throat, strangulation, and sometimes swelling of the upper air passages.

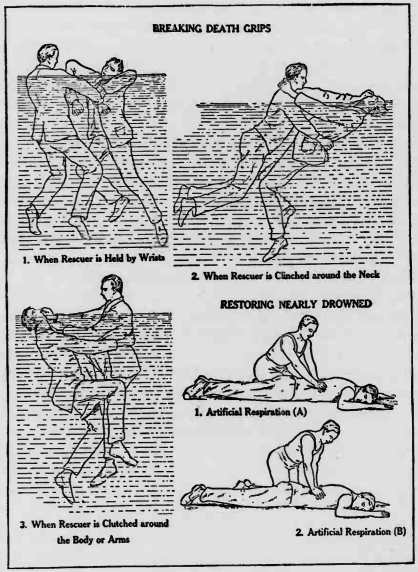
Symptoms of suffocation.—When a person for any reason is not getting sufficient fresh air the face becomes blue or almost black, the veins stand out, and he fights frantically for breath. If relief is not obtained, the efforts to secure air become more violent and the duskiness of the face increases. Convulsions may occur, but finally unconsciousness sets in, to be followed shortly by death. A person who has been apparently dead from suffocation for several minutes or longer may frequently be revived if the cause is quickly removed and artificial respiration immediately started.

DROWNING.

Prevention.—Ordinary care and caution will do much to prevent accidents in the water. Inexperienced persons should not attempt to handle sailboats or even rowboats. Pleasure craft should not be overloaded nor attempts be made to change seats in small boats except with great caution.

The swimmer should be careful not to overtax his strength, not to remain in the water too long, nor to get so far out that he might be caught by the undertow. Every child should be taught to swim, and all parents should appreciate the necessity of their children being given this training.

RESCUE OF DROWNING PERSONS.—If possible, do not attempt to rescue a drowning person in deep water by entering the water yourself. The best interests of the drowning person are served, when practical, by holding out or throwing something into the water on which he can support himself till he can be pulled ashore or reached in a boat. In case a person has fallen into deep water near the shore take an oar, a pole, a rope, or even your coat and hold it out so the drowning person may grasp it. Life preservers, boxes, boards, or logs may also be thrown into the water close to the person drowning. As has been stated above, a small, floating object is quite sufficient to sustain a person's weight in the water.



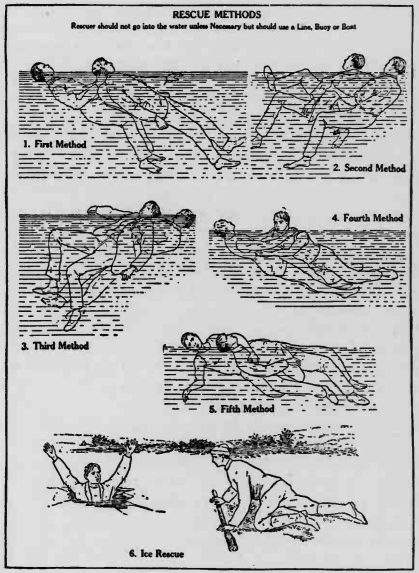
INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF.

1. When you approach a person drowning in the water, assure him, with a loud and firm voice, that he is safe.

2. Before jumping in to save him, divest yourself as far and as quickly as possible of all clothes; tear them off, if necessary; but if there is not time, loose at all events the foot of your drawers, if they are tied, as, if you do not do so, they will fill with water and drag you.

3. On swimming to a person in the sea, if he be struggling, do not seize him then, but keep off for a few seconds till he gets quiet, for it is sheer madness to take hold of a man when he is struggling in the water; and if you do, you run a great risk.

4. Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible onto his back, give him a sudden pull, and this will cause him to float, then throw yourself on your back also and swim for the shore, having hold of his hair, you on your back and he also on his, and, of course, his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you



can easily thus swim with two or three persons. One great advantage of this method is that it enables you to keep your head up, and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair and throw both the person and yourself on your backs. After many experiments, it is usually found preferable to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

5. It is believed there is no such thing as a death grasp; at least it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose his recollection, he gradually slackens his hold until he quits it altogether. No apprehension need, therefore, be felt on that head when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air bubbles, which will occasionally rise to the surface, allowance being, of course, made for the motion of the water, if in a tideway or stream which will have carried the bubbles out of a perpendicular course in rising to the surface. Oftentimes a body may be regained from the bottom before too late for recovery by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom the hair of the head should be seized by one hand only and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try to get to land. If there be a strong "outsetting" tide, and you are swimming either by yourself or having hold of a person who can not swim, then get on your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide and sinks in the effort, when if he had floated a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

The popular idea that a drowning person rises to the surface three times is apparently incorrect. Some persons never come to the surface at all. Others come up but once, so no assumption should be made that the rule of coming up three times will always hold true.

When a person has been brought to land or other safe place, if he is unconscious, the first procedure is to get the water out of the lungs. To do this roll him on his face, stand astride of the hips, and clasp the hands under the lower part of the abdomen. Lift up the hips and abdomen by straightening the back. This will cause the head to be lower than the lungs and the water will run out of the mouth. Hold in this position for a few moments, or as long as the water runs out of the mouth, giving the body several slight shakes. Then sweep the finger into the mouth to see that the throat is not clogged with sand, seaweed, or other matter, remove tight clothing from around the neck or throat and begin artificial respiration immediately. It is not necessary to roll an apparently drowned person over a barrel to get the water out of him. Attempts at resuscitation on a beach should not be made with the part of the body submerged in the water or in such a position that a wave may sweep over the unconscious person. It is better to drag him well up where he will be dry and out of danger.

Artificial respiration on apparently drowning persons should be carried out as directed for suffocation. As soon as the person is revived and the breathing is satisfactory he should be taken to some warm place, the extremities rubbed, and suitable general remedies administered.

ELECTRIC SHOCK.

Many of the wires strung about city streets carry powerful electric currents. If such wires become broken or sag down, passers-by may come in contact with them and receive severe and possibly death-dealing shocks.

Prevention.—Broken wires of any sort dangling from their poles should not be touched. They may carry dangerous currents themselves or be temporarily charged, because they are somewhere resting on live wires.

Symptoms.—In severe electric shock there is sudden loss of consciousness, the breathing is apt to be entirely arrested, and the pulse weak. Burns may be caused by the arcing of the current where the wire has touched the body.

Treatment.—The first thing to be done is to break the contact of the person with the wire or third rail; great care must be exercised in doing this or the helper may be as badly injured as the original victim. The body of a person lying upon a conductor is fully charged with the electricity, and it is dangerous to touch it with bare hands unless the body of the assistant is thoroughly insulated. The coat, however, may be grasped, and possibly the injured person can be dragged from the wire in this manner without actually touching the flesh. If absolutely necessary to take hold of the body, wrap the hands in several thicknesses of dry cloth, rubber sheeting, or dry newspapers, and stand on a dry board or other nonconductor if possible.

A live wire may be removed from an unconscious person by lifting it off with a dry pole, wooden walking stick, or some similar article made of wood, which is a nonconductor. The wood must be dry, however. The person endeavoring to perform the rescue should in all cases stand on a dry board if it is obtainable. A number of newspapers, or the operator's folded coat, will answer the same purpose in an emergency. Rubber overshoes and heavy rubber gloves furnish good protection. If the powerhouse is near or there is a switch in the locality, it may be better to attempt to have the current turned off rather than to try other procedures. If the live wire is so twisted around the body that it is necessary to cut it, use an ax or hatchet with a wooden handle. Be careful that the cut end does not strike the operator.

When a wire is taken off the body or a person removed from the wire, this should be done with one motion if possible, because if the wire touches the person several times burns will be received at each contact.

After the person has been removed from the current, if he is not breathing, artificial respiration should be immediately performed followed by the usual restorative measures as described before.

GAS POISONING.

Gas poisoning is a frequent accident, especially in the larger cities and towns where gas is used for illumination purposes. Various gases may be detrimental when inhaled for a considerable period,

the amount of injury depending upon the nature of the substance, and even apparently innocuous gases, such as carbon dioxide, may cause death, not by their direct action but by depriving the patient of air because they have replaced it, and the patient is not getting oxygen. Gases like ammonia or chlorine may quickly produce death from shock and irritation. Recently deaths have been reported from the gas generated by an automobile engine running in a small garage which was tightly closed on a cold morning. The use of poisonous and irritating gases in warfare has been developed to a great degree in the present European war.

Firemen are frequently overcome from the effects of smoke and the products of combustion from wood, varnish, and other materials in burning buildings.

By far the greater number of cases of suffocation due to gas in this country are caused by illuminating gas. Many persons use this method of committing suicide.

Prevention.—A gas burner should never be turned down low and allowed to burn all night in a room in which persons are sleeping, as the flame may be extinguished by a change in pressure or a slight draft and later the room become filled with gas. When going into burning buildings which are filled with smoke it is well to tie a cloth wet with water around the nose and mouth. As the air is generally purer near the floor than at the ceiling, the person should, if necessary, walk on the hands and knees or crawl on the floor. In entering a room or other place which is full of gas to remove a suffocated person take several deep breaths of pure air outside and spend as brief a time in the compartment as possible.

Symptoms of illuminating-gas suffocation.—Preliminary signs are headache, dizziness, nausea, feeling of sleepiness and langour, and a rapid pulse. In later stages when unconsciousness comes on, the face and hands are blue, heart action is very rapid and weak, and breathing may be shallow or entirely suspended.

Treatment.—The patient should always be immediately removed to where the air is fresh and good. If he is only slightly affected, walk him up and down in the open air and give some effervescing drink, such as soda water, Weiss beer, or a teaspoonful of baking soda in a glass of water. This will cause belching of the gas and relief from nausea.

In more severe cases, when the patient is more or less unconscious but still breathing, sprinkle a few drops of ammonia water on a handkerchief and allow the patient to take one breath with this under his nose, once a minute. Rub the arms and legs briskly toward the heart to promote the circulation. If the patient is conscious enough to swallow, give one-half teaspoonful of aromatic spirits of ammonia in half a glass of water.

If breathing has ceased, begin artificial respiration at once, after loosening the collar or any tight clothing around the neck and chest. Have an assistant give whiffs of ammonia, as described above, and also rub the extremities toward the heart; but do not let these procedures interfere with the artificial respiration, which must be continued without interruption until the patient begins to breathe of his own accord in a regular manner.

The after treatment is rest in bed with appropriate stimulation. In severe cases the patient should be kept in bed until he has fully recovered, as dangerous symptoms have followed getting up too early.

UNCONSCIOUSNESS.

Description.—A person is unconscious when he does not realize what is going on around him. Unconsciousness may be complete or partial. In the latter case the individual can be aroused, but is not fully in the possession of his senses.

Causes of unconsciousness.—All forms of unconsciousness are due to a disturbance of the brain of some sort. The causes which act on the brain and produce this condition are many and varied. A blow on the head or pressure on the brain from a large blood clot or a depressed fracture of the skull may cause unconsciousness. A lack of blood supply to the brain produces the same condition as in fainting. Certain drugs, like opium, ether, chloroform, or large amounts of alcohol when circulating in the blood affect the brain and are followed by loss of consciousness. Such substances may be absorbed from the stomach or inhaled and taken up by the lungs. The system itself may produce poisons which are not gotten rid of and unconsciousness follows. This frequently occurs before death from diabetes. Finally, unconsciousness may be a symptom indicating a disease of the nervous system such as epilepsy.

An unconscious person is absolutely helpless and especially dependent on his friends or whoever happens to be near for aid and protection from harm. However, a word of warning concerning the handling of unknown unconscious individuals in public places may not be amiss. It is not wise to follow a perfectly natural impulse to search the clothing or to look through the pocketbook of an unconscious person to ascertain his name and address. Such an act may be interpreted by the bystanders as an attempt at robbery, and unpleasant complications result. These measures should be left to the police or other persons of recognized authority.

GENERAL RULES FOR THE EXAMINATION OF UNCONSCIOUS PERSONS.

1. Feel the pulse at the wrist and form an estimate of its rate and force. A rapid, weak pulse indicates a dangerous condition. A strong pulse, beating between 76 and 90, is a good sign.

2. Determine whether the person is breathing or not and the nature of the respirations; whether they are slow or fast, deep or shallow.

3. Note the color of the face.

4. Observe if the skin is hot or cold and the presence or absence of perspiration.

5. Examine the eyes to see if the pupils or black spots in the middle of the eye are small or large. Compare the two eyes to see if the pupils are of the same size.

6. If the person has evidently been the victim of an accident, look for hemorrhage and feel the head to detect possible fractures of the skull.

7. Take into consideration the surroundings and other general conditions. When the heat is excessive, heat strokes are a common cause of unconsciousness. An empty bottle near by may suggest attempted suicide by poisoning. Signs of a struggle might indicate an assault, with brain injury.

FAINTING.

Fainting is a temporary loss of consciousness due to insufficient supply of blood to the brain.

Some persons faint very much more easily than others. The tendency toward fainting does not always depend upon the physical strength, and strong men sometimes faint from very slight causes.

Persons may faint from exhaustion, weakness, hemorrhage, extreme heat, lack of air, or some emotional shock, such as fear or the sight of blood. There is a very important mental element in almost all fainting attacks.

Symptoms.—A feeling of weakness comes over the patient and black spots float before the eyes. The face becomes pale or greenish yellow, and the lips lose their natural color. Cold perspiration breaks out on the forehead. There is a tendency to yawn; the pulse is rapid and weak and the respirations are very shallow. Finally, the patient sinks back in his seat or falls to the ground unconscious.

Treatment.—When the beginning of the attack is felt or noticed, it may be possible to check it by lowering the head between the knees. If in spite of this the symptoms continue, immediately place the patient in a recumbent position and lower the head. When a couch or bench is available, lay the person on it with the head hanging over the end or side. The color of the face is a good indicator of the blood supply of the brain. A pale face indicates a lack of blood in the brain. Lowering the head causes the blood to go to the brain by gravity. As a general rule in all accidents, if the face is pale, lower the head. If the face is red, raise the head on a pillow or coat.

It is important that the fainting person should have plenty of fresh, cool air. This alone will often bring about recovery. Dashing cold water on the face or chest is useful. Smelling salts or a few drops of ammonia water on a handkerchief held under the nose at intervals of a minute apart, until the patient has taken one breath, and fanning the face, will assist in recovery, but ordinarily all that is required is a recumbent position with the head low. When the patient becomes conscious give one-half a teaspoonful of aromatic spirits of ammonia in water if available. Do not permit the person to get up or attempt to walk until he or she is fully recovered.

FITS.

Fits are a symptom of a disease called epilepsy in which the patient goes into a more or less violent convulsion with gnashing of the teeth and frothing at the mouth and then falls unconscious. These attacks may occur at rare intervals or as frequently as several times a day. The attacks differ greatly in their severity as well as their frequency. The period of unconsciousness may be only momentary or may continue for several hours. The patient is apt to bite his tongue during the convulsion or to fall and injure himself by striking some hard object.

Treatment of the convulsion.—Do not attempt to prevent the movements or to break the grip as the fit can not be checked in this way. Lower the patient to the ground or floor and simply protect him from harm by gentle restraint and guard against biting the tongue by inserting a piece of wood or a wad of paper between the teeth and holding it in place.

No effort should be made to arouse the person from the period of unconsciousness which follows, but he should be warmly covered and placed in a safe place and allowed to sleep until he awakens naturally.

In examining unconscious persons in which a fit is suspected always look at the tongue and also the forehead and face. If the tongue is badly scarred, or if there are many old scars around the forehead, it is strongly presumptive that the person has epilepsy. In the unconsciousness following an epileptic attack the pulse is good, the breathing is regular, the face is slightly pale, and the pupils are equal.

BRAIN INJURIES.

Concussion.—By concussion is meant a shocking or jarring of the brain substances such as follows a blow on the head.

Symptoms.—The symptoms are dizziness, nausea, and more or less loss of consciousness, depending upon the severity of the injury.

Treatment.—Place the person in a recumbent position with the head slightly raised and allow him to react. Stimulate by placing a few drops of ammonia water on a handkerchief and every minute

hold it under the nose until the patient has taken one breath. Too much ammonia is very irritating hence the patient should be given only an occasional whiff of the gas. When he can swallow administer one-half teaspoonful of aromatic spirits of ammonia in a little water.

APOPLEXY.

Apoplexy, or a stroke as it is sometimes called, is due to the spontaneous rupture of a blood vessel in the brain and the resulting hemorrhage into the brain substance. Apoplexy generally occurs in elderly individuals, especially those who are of the type known as full-blooded. Reference is often made to hardening of the arteries, which is a frequent cause of apoplexy. In certain persons the arteries lose their elasticity and actually become hard. The artery at the wrist may be felt through the skin, somewhat resembling a hard cord or a pipestem. When a general hardening of the arteries takes place throughout the body the blood pressure rises and the arteries are weaker than normal. The arteries in the brain are not supported by the surrounding tissues, hence rupture of a vessel is more apt to take place here than in other parts of the body.

Symptoms.—These are practically the same as those of compression. The patient suddenly or gradually becomes unconscious. The pulse is generally weak and rapid, but may at first be unusually slow and strong. The breathing is slow, the patient snores, and the lips and cheeks puff out at every expiration. The mouth is drawn to one side and the patient, if he endeavors to talk, talks out of that side. The face is red and the skin warm. The pupils are unequal. If the patient is unconscious he can not be aroused. There is usually paralysis of one side of the body.

Wounds of the brain.—Severe head injuries may be accompanied with actual wounds of the brain or escape of the brain substance.

Symptoms.—These are varied, depending upon the location of the injury and the amount of damage done, but generally resemble either severe concussion, compression, or both.

Treatment.—First-aid treatment of compression of the brain, brain injury, and apoplexy is the same. Raise the head on a pillow, give plenty of fresh air. Send immediately for medical help. Pending the arrival of the doctor cold cloths may be laid on the head, if there is no wound of that region. *Do not in any case give alcoholic stimulants.*

POISONING.

GENERAL COMMENTS.

The symptoms of poisoning depend upon what poison has been taken. Many poisons produce nausea, vomiting, purging, and collapse. Others bring on convulsions, or spasms, and a few cause the

patient to become gradually unconscious without any other striking symptoms.

In endeavoring to determine what poison has been taken, if no information can be obtained from the patient, an examination of the surroundings may throw light on the case. An empty bottle may be discovered in the vicinity or some of the substance may have been spilled over the floor or clothing which can be smelled and otherwise examined. It may be ascertained that certain poisons were in the house and one of these may show signs of having been recently opened or handled. Always smell the breath and examine the mouth. The mouth may be stained or burned by certain chemicals in a characteristic way, such as follows drinking carbolic acid or other strong acids.

If the patient has taken a drug accidentally he will, of course, be willing to tell what it was, if he is conscious.

A skilled physician is often able to decide from the symptoms what poison has been taken, but this can not be expected of a layman. Always send immediately for a doctor if poisoning is suspected, but pending his arrival certain first-aid measures may be undertaken.

General treatment of all poisoning.—In the absence of a direct knowledge as to just what to do, the following line of procedure is recommended:

First. Give the antidote if it is known and available. Lacking the proper antidote, white of eggs, milk, or strong tea may be administered, as they will do no harm and are somewhat antagonistic to a number of common poisons.

Second. Get the poison out of the stomach as promptly as possible.

After administering the antidote the stomach should be emptied as quickly as possible. The antidote is expected to combine with the poison and render it harmless, but it may not be effective, or the resulting mixture may be harmful if afterwards absorbed. To cause vomiting, tickle the back of the throat with the forefinger or give an emetic.

Emetics.—Emetics are substances which produce vomiting. The ones most available are luke-warm water mixed with mustard or common salt. A heaping teaspoonful of mustard or salt to a cupful of like-warm water—stir it and have the patient drink the mixture. Repeat the dose every 10 minutes until 3 or 4 tumblerfuls have been swallowed if vomiting does not occur sooner. It is well to cause the patient to vomit several times and to have him drink freely of luke-warm water in the intervals. This process assists in washing out the stomach. One or two teaspoonfuls of sirup of ipecac or wine of ipecac are good emetics. Such preparations of ipecac are often kept in the home to administer to children with croup.

There are a few poisons in which it is not wise to give an emetic, but in an emergency, in the absence of a doctor and specific knowledge to the contrary, the general rule for giving an emetic holds.

Third. After giving the emetic and producing vomiting, the various symptoms which arise should be treated according to the nature of the case.

If the pulse becomes rapid and weak, hot coffee, one-half teaspoonful of aromatic spirits of ammonia, or small doses of whisky or brandy should be given. If the patient is greatly weakened and prostrated, as he generally will be, hot-water bottles should be applied around the feet and extremities and measures taken to sustain the general strength.

WARNING.—Poisons, such as carbolic acid or antiseptic tablets, should not be kept on the same shelf with harmless remedies. Such drugs should be kept in a separate place or in a special box and well out of the reach of children. Poisonous solutions should never be left in drinking glasses, as children or even adults may drink them without the knowledge of their dangerous character.

PTOMAINE POISONING.

Certain kinds of bacteria when they grow in some foods, especially fish, shellfish, and mixtures of eggs with cream or milk, produce highly poisonous compounds called ptomaines. The eating of such contaminated food is followed by ptomaine poisoning. The formation of the ptomaines in food is favored by warm weather and long keeping.

Symptoms.—Headache, pain in the muscles, nausea, thirst, intense pain in the stomach, vomiting, and purging. The patient rapidly grows very weak and in severe cases goes into collapse. The symptoms may come on immediately after the food has been eaten or may not appear for some hours.

Treatment.—If vomiting has not occurred, give an emetic. Also administer a rectal injection of a pint of soapsuds to quickly empty the bowel. Follow the emetic in half an hour with a large dose of castor oil. Keep the patient in bed, administer stimulants if necessary, such as small doses of strong coffee or a tablespoonful of whisky every two hours. Surround the extremities with hot-water bottles. Keep the patient warm.

Vomiting can be held in check by small drinks of plain soda water, ginger ale, or of iced champagne if available. No food should be allowed until the acute symptoms have subsided, and then only a liquid diet in small quantities at first.

A characteristic feature of true ptomaine poisoning is that the patient remains weak for a long period and that recovery is very slow, oftentimes requiring several weeks.

LIST OF REMEDIES AND THEIR USES.

DOSES.—Unless otherwise stated, the doses mentioned in this book are intended for adults. To determine the dose for children, add 12 to the age of the child and divide the age of the child by this sum. This fraction will represent the size of dose compared with that for an adult. For example, a child 6 years old will require $\frac{6}{6+12}=\frac{6}{18}$, or one-third of the adult dose.

CAUTION.—Preparations containing opium, such as laudanum, paregoric, camphor and opium pills, Sun Cholera Mixture tablets, etc., should not be used except where absolutely necessary, as their continued use is liable to produce the drug habit.

Alcohol.—Externally is useful as a mild antiseptic wash for wounds. As a liniment, pure or diluted with from 1 to 3 parts of water, is cooling and stimulating.

Aromatic spirit of ammonia.—Useful in hysteria, faintness, headache, flatulent colic, nervous debility, and as a stimulant in shock. Dose: ½ to 1 teaspoonful in water every half hour until three doses are taken.

Belladonna plaster.—Useful in coughs, colds, rheumatism in joints and arms, lumbago, and pains in small of back. Should be worn only long enough to have the desired effect. If the throat becomes dry or the pupils dilated, indicating belladonna poisoning, the plaster should be removed.

Bicarbonate of soda (baking soda).—Internally useful in sour stomach and heartburn. Dose: ½ to 1 teaspoonful in half tumbler of water. Repeat in half an hour if necessary.

Bismuth subnitrate (5-grain tablets).—Useful in dysentery, diarrhea, and heartburn. Dose: 2 to 4 tablets every three hours. (Crush before taking.)

Borax.—Useful in sore mouth. One tablespoonful dissolved in a pint of water and used as a mouth wash several times a day.

Boric acid (boracic acid).—One-half teaspoonful may be dissolved in a glass of water and used as a lotion for the eyes or ears.

Bromide of potash (5-grain tablets).—Useful in convulsions, and delirium tremens. Dose: 3 to 5 tablets, dissolved in water, three times a day.

Brown-mixture lozenges.—Useful in bronchitis, coughs, and colds. Dose: 1 lozenge allowed to dissolve slowly in mouth; to be repeated as required.

Calomel ($\frac{1}{10}$*-grain tablets*).—Useful in constipation and dysentery. Dose for adults and children: Take 2 tablets every 15 minutes until 20 tablets are taken. When from 4 to 6 hours have elapsed a Seidlitz powder or a dose of Rochelle or Epsom salt should be taken. The

dose of the Seidlitz powder or salt should be proportionate to the age of the patient.

Camphorated oil (for external use only).—In sprains, bruises, neuralgia, rheumatism, and pains and swellings of the breasts or joints it should be gently rubbed on the painful part. Applied on hot flannel to chest and neck for colds.

Carbolic acid, liquid (poison).—Useful as an antiseptic and disinfectant when mixed in the proportion of 1 part of acid to 100 parts of hot water. Useful without dilution to arrest the development of boils and carbuncles and as an application to ulcers and venereal sores. Should be applied cautiously. The surface should be merely touched with a small piece of cotton moistened with a drop of the acid, care being taken not to burn the surrounding skin. Do not use internally.

Castor oil.—Useful in constipation. Dose: 1 to 2 tablespoonfuls.

Compound carthartic pills, vegetable.—Useful in constipation. Dose: 1 to 3 pills at night.

Compound solution of cresol.—Useful as antiseptic and disinfectant when mixed with water in from 1 to 3 per cent solutions. Do not use internally.

Epsom salt.—Useful in constipation and dysentery. Dose: 1 to 2 tablespoonfuls dissolved in as little water as possible. A little lemon juice and sugar may be added to disguise somewhat its bitter taste.

Essence of peppermint.—Useful in cramps, colds, gas in stomach, and colic. Dose: 10 drops to ½ teaspoonful in sweetened water or on sugar. Externally is useful in rheumatism, neuralgia, and toothache.

Flaxseed meal.—Useful as hot poultice to apply to boils and felons. Compresses wet with hot bichloride solution, 1 tablet to 5 pints of hot water, are better. To prepare flaxseed poultice a receptacle containing boiling water should be placed on the fire, the flaxseed meal should be gradually added and constantly stirred until the batter is jellylike. This should be evenly spread, with a thickness of from ¼ to ½ inch, to within 2 or 3 inches of the border of a cloth prepared for that purpose by folding in two or three layers. To prevent the poultice from adhering to the skin any of the following may be placed on its surface: Gauze, mosquito netting, cheesecloth, vaseline, or sweet oil.

Formalin (poison).—Used as a disinfectant generally in connection with permanganate of potash, as follows: For every 1,000 cubic feet of room space to be disinfected use ½ pound of permanganate of potash, powder or crystals, and from 1 to 1¼ pints of formalin. Add the permanganate of potash to the formalin contained in a deep tin pail. Effervescence begins at once, the room is tightly closed, and the operation is over in about 10 minutes. After 12 hours the room is opened and aired.

Glycerin.—Is a mild and healing application for sores, chaps, etc. When mixed with an equal quantity of water is useful in earache, hard, irritated, or feverish skin, chapped face or hands, split lips, and chafing.

Lead and opium wash (poison) (shake well before using).—Soothing external application in sprains and bruises.

Lemon juice.—Useful in fevers and inflammatory complaints. Hot lemonade on retiring is useful to aid in the relief of a cold in its first stages.

Lime water.—Internally is useful in soothing sick stomach, heartburn, diarrhea, and in dyspepsia attended with acidity of the stomach. Dose: 1 to 3 tablespoonfuls. For sick stomach, to be repeated after each effort to vomit. Externally as liniment (mixed with an equal quantity of linseed, cottonseed, or olive oil) for burns and scalds.

Mustard.—Externally is useful to draw the blood to the surface in case of pain where skin is not broken. Should be employed as a plaster or poultice, made as follows: 1 part of mustard is thoroughly mixed with from 2 to 4 parts of flour and made into a paste by the addition of a small amount of tepid water. This is then spread thinly to within 1 or 2 inches of the border of a cloth prepared by folding in two or three layers of old cotton cloth. The amount of mustard depends upon the degree of pain, the age of the patient, etc. Care should be taken that the mustard does not blister the skin. As a rule, mustard plasters or poultices should not be applied to children and old people, as they may blister the surface. Internally given to produce vomiting, 1 tablespoonful stirred to a cream with a cupful of tepid water.

Olive oil (sweet oil).—Internally is useful in constipation. Dose: 2 to 3 tablespoonfuls. Externally is a soothing application to blistered, burned, scalded, or other injured surfaces, also to piles.

Oil of wintergreen (methyl salicylate).—Useful, when mixed with an equal amount of olive oil, as an application for the relief of neuralgia, rheumatism, and painful joints. The oil should be gently rubbed on the painful area. If used about the head care should be taken that none gets into the eyes.

Permanganate of potash.—Useful in gonorrhea as an injection: ¼ teaspoonful dissolved in 2 quarts of water. One teaspoonful to a quart of water makes an efficient wash for perspiring feet. Useful in snake-bites in the form of a concentrated solution which should be injected freely and immediately into and around the part which has been bitten. Useful as a general antiseptic in solution (1 tablespoonful dissolved in a quart of water). As a disinfectant, see "Formalin."

Peroxide of hydrogen solution.—Is cleansing and slightly antiseptic. Useful as a gargle in sore throat, diluted with an equal quantity of water. Useful to apply to wounds, boils, and abscesses, after diluting with from 1 to 3 parts of water.

Picric acid (poison) dissolve in water (½ per cent solution).—Useful to wet dressings with, as an application to burns.

Syrup of ipecac.—Useful in croup, bronchitis, cough, and hiccough. Dose: 10 drops every three hours. Also used to produce vomiting in doses of 1 to 2 tablespoonfuls.

Soap liniment (for external use only).—Useful in rheumatism, sprains, and bruises.

Spirit of Camphor.—Internally is useful in nervous diarrhea, colic, and cramps. Dose: 5 to 30 drops, first added to sugar and then mixed with water.

Sun Cholera Mixture (poison) (15-minim tablets).—Useful in diarrhea, dysentery, and cholera morbus. Dose: 1 tablet.

Sweet spirits of niter.—Useful in fevers, flatulent colic, and colds. Dose: ½ teaspoonful in sweetened water every four hours.

Tincture of green soap.—Cleansing hands.

Tincture of iodine (poison) (for external use only).—Useful to disinfect wounds; should be diluted with an equal quantity of alcohol or water. If painted over inflamed surfaces, will sometimes be of value.

Turpentine.—Used in the form of hot turpentine stupes in typhoid fever, pneumonia, colds, bronchitis, lumbago, pleurisy, and inflammation of the bowels. The stupes are prepared by wringing a double layer of thin flannel out of a pint of hot water with which a teaspoonful of turpentine has been mixed. These applications should not be prepared too close to a fire on account of the inflammability of the turpentine.

Vaseline.—Internally and externally useful for the relief of cold in the chest. Externally useful in cold in the head, soothing irritated surfaces, burns, and scalds, and as a protective dressing.

LIST OF SURGICAL SUPPLIES FOR MEDICINE CHESTS.

One adhesive plaster, 10-yard reel, 1 inch wide.
One dozen applicators, small, wooden.
One dozen bandages, 2-inch by 3-yard (½ dozen gauze and ½ dozen muslin).
One dozen bandages, 2-inch by 5-yard (½ dozen gauze and ½ dozen muslin).
One dozen bandages (4-inch by 5-yard muslin).
Six bandages, triangular (Esmarch's bandage), with figures printed on them showing the various ways they can be used.
One bistoury.
Three camel's-hair brushes.
One catheter, rubber, No. 20 F.
One corkscrew.

One forceps, artery (hemostatic forceps). This can be used to grasp a bleeding vessel until it can be tied, or until the doctor arrives. A catch holds the grip of the forceps. Sterilize by boiling.
One forceps, dressing or dissecting. Will be found convenient in cleaning up a wound and applying dressings; also in removing splinters, etc. Sterilize by boiling.
One fountain syringe, 2-quart.
One urethral syringe, glass. (For washing out wounds.)
Five yards gauze, picric acid. Good dressing for wounds and scalds.
Five yards gauze, plain, sterile.
One hot-water bottle, rubber 2-quart. Metal bottle preferred.
Six medicine droppers.
One medicine glass.
Two nail brushes.
Two dozen safety pins, large.
One scissors, dressing, surgeon's, for cutting gauze and bandages. Sterilize by boiling.
One shears, for cutting cotton and muslin, etc.
Three splints, wooden. Straight and angular splints made of thin board, as described in chapter on "Fractures."
One spool of silk ligature, medium size.
Two surgical needles, in glass-stoppered bottles.
One thermometer, clinical, Fahrenheit.
One tooth forceps, incisor.
One tooth forceps, molar.
Two pieces wire gauze, made of heavy mesh malleable wire. When well padded can be wrapped around a fracture for temporary dressing.
Two sheets Yucca palm (a thin fiber board). Can be wrapped around a fracture for temporary dressing.

Gauze and bandages should be in paraffin-paper packages, sealed after sterilization.

Catheters and other rubber goods should be in sealed paraffin packages or envelopes, slightly dusted with sterile talcum on the inside of the package.

Scissors and instruments, if not in cases, may be coated with paraffin, which will come off when dipped in hot water.

DON'T FORGET TO CALL THE DOCTOR.

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